EN14972-1:2020
The European watermist standard
Implementation date
30th June 2021

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IWMA
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Current state of the EN 14972-1:2020

News about the publication of the EN 14972

EN 14972-1:2020 - Title: Fixed firefighting systems - Water mist systems - Part 1: Design, installation, inspection and maintenance

Scope: This document specifies requirements and gives recommendations for the design, installation, inspection and maintenance of all types of fixed land-based water mist systems. This document is intended to apply to water mist automatic nozzle systems and water mist deluge systems supplied by stand alone or pumped systems. The document covers only applications and occupancies which are covered by the fire test protocols of the EN 14972 series. Aspects of water mist associated with explosion protection and/or use within vehicles are not covered by this document. This document does not cover all legislative requirements. In certain countries specific national regulations apply and take precedence over this document. Users of this document are advised to inform themselves of the applicability or non-applicability for this document by their national responsible authorities.

Status: published

Available since 23rd Dec 2020 (according to the CEN webpage)

The document is now available at national level and the member countries have until 30th June 2021 to implement its publication, and thereby give it the status of a national standard, and at the same time withdraw CEN/TS 14972:2011. The dates when the official documents will be available may vary from country to country.

Official publication date: 30th June 2021

By then the document will have been translated and can be purchased from the common webstores.

- **Scope: Document explains how to install WM systems and more, introducing the DIOM concept.**
- **Also emphasizes the connection between the EN14972-1 and the accepted fire test protocols, part 2-17, mentioned in this document.**
- **It also mention that certain specific national regulations apply and can take precedence over the document.**
- **The implementation date for the publication is 30th June 2021.**

Detail - IWMA International Water Mist Association

Important Documents

This is the unique DNA of each individual WM system. What you find in the fire and component test is described here.

Technology	Main standard (the general information)	Fire test protocols	Manufacturers unique information	System Component test protocols
Watermist	EN14972 part 1	EN14972 part 2-17 (more parts will come in the future)	DIOM manual (design, installation, operation and maintenance manual)	EN17450 series
Sprinkler	EN12845		Datasheet or/and manual	EN12259 series

As most sprinklers, no matter who manufactures these are similar, you will find most of the info for designing your system, in the relevant main standard.

This means, the biggest difference between designing the two technologies is, the DIOM gives the unique info needed for the install, for each manufacturer's system/products.

Overview of EN 14972-1:2020

Subject	Reference
Accepted pump units + water supply.	Reference to EN 14972 part 1 for water supply requirements. For pump(units) reference to: Low pressure: EN12845 & EN12259-12 (centrifugal) High pressure: EN 14847 (positive displacement pumps) In later stage pumps will be covered by EN17450 series.
Accepted water tanks, valves, hangers, strainers,	Covered partially by EN14972 with references to EN12259 and EN12845 for LPWM and EN12094 for high HPWM components. In later stage valves will be covered by EN17450 series. EN17450-1 covers strainers.
Accepted Pipes	Covered by EN14972-1 with references to EN12259 and EN12845 for LPWM and EN12094 for HPWM components.
Accepted Nozzles	Reference to EN 17450 series for component tests and EN 14972 part 2-17 for fire performance capabilities.
General component material requirements	Covered by EN14972-1. Stainless steel or equivalent and synthetic materials may be used if found not to create clogging).
Fire test accepted	Reference to EN 14972 part 2-17
General design and Installation, requirements.	Reference to EN 14972-1 1 + DIOM manual (manufacturers) Design, Installation, Operation & Maintenance Manual
Design area and discharge time	Defined for each of the EN 14972 part 2-17.
Commissioning and Maintenance requirements.	Reference to EN 14972-1 + DIOM manual (manufacturers) Design, Installation, Operation & Maintenance Manual

The 2020 Update on EN 14972-1:2020 Part 2-17.

Typical areas covered with part 2-17

1. generator rooms
2. technical rooms
3. server rooms
4. conference rooms
5. reception/lobby area
6. kitchens
7. restaurant and canteen
8. storage rooms
9. offices
10. hotel rooms
11. corridors
12. concealed spaces
13. shops
14. atriums
15. fitness area
16. spa area
17. enclosed car parks

The format of

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 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 m³ for open nozzle systems;*

— *Part 9: Test protocol for machinery in enclosures not exceeding 260 m³ 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 m³ for open nozzle systems;*

— *Part 15: Test protocol for combustion turbines in enclosures not exceeding 260 m³ 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.*

Overall information covering all system

Specific system design parameters are found through successful testing (to part 2-17). More protocols / parts will be issued in the future. Missing applications can be covered with EN14972 annex A

Specific requirements for WM component such nozzles, valves, pumps, etc. will be issued in new parts in the future (in new EN series EN17450)

VdS

LPCB

cen + DFL www.dafila.com

FM Approvals Member of the FM Global Group

ISO

- *EN 17450 part 1-X: Requirements for watermist components such as nozzles, valves, filters/strainers, pumps* → VdS + FM Approvals + LPCB + cen

The status of EN 14972-1:2020

Part Number	Document type	Scope	Status May. 2021	Estimated time
EN 14972 part 1	Design, installation, inspection and maintenance	Buildings	Implementation date June 2021	>3 years
EN 14972 part 2	Fire test protocol	Shopping and sales areas	Waiting for "Working item"	<3 years
EN 14972 part 3	Fire test protocol	Office, school and hotel	Publication in process.	<2 years
EN 14972 part 4	Fire test protocol	Non storage occupancies	Waiting for "Working item"	<1 year
EN 14972 part 5	Fire test protocol	Car garage	Waiting for "Working item"	<½ year
EN 14972 part 6	Fire test protocol	False floor and ceiling	Registred as active working item.	Ready
EN 14972 part 7	Fire test protocol	Commercial low hazard occupancies	Registred as active working item.	
EN 14972 part 8	Fire test protocol	Machinery enclosures>260m³	Finished and implemented Jan. 2020	
EN 14972 part 9	Fire test protocol	Machinery enclosures<260m³	Finished and implemented Jan. 2020	
EN 14972 part 10	Fire test protocol	Atrium	Formal vote closing July 2021	
EN 14972 part 11	Fire test protocol	Cable tunnels	Registred as active working item.	
EN 14972 part 12	Fire test protocol	Commercial deep fat fryers	Waiting for "Working item"	
EN 14972 part 13	Fire test protocol	Wet benches and similar processing equipment	Waiting for "Working item"	
EN 14972 part 14	Fire test protocol	Combustion turbine enclosures>260m³	Formal vote closing July 2021	
EN 14972 part 15	Fire test protocol	Combustion turbine enclosures<260m³	Formal vote closing July 2021	
EN 14972 part 16	Fire test protocol	Industrial Oil cookers	Finished and implemented Aug. 2019	
EN 14972 part 17	Fire test protocol	Residential and domestic occupancies	Registred as active working item.	
18-X	New fire test protols	N.A.		
EN 17450 series	Component test protocol	Nozzles	Publication in process.	
EN 17450 series	Component test protocol	Check valves	Waiting for "Working item"	
EN 17450 series	Component test protocol	Control deluge valves and actuator	Waiting for "Working item"	
EN 17450 series	Component test protocol	Pressure switches	Waiting for "Working item"	
EN 17450 part 1	Component test protocol	Strainer and wire mesh	Finished and implemented Feb. 2021	
EN 17450 series	New component test protocol	N.A.		

Note: the list of "parts" will grow over time and if there is a missing part, the risk can always be covered by EN14972-1:2020 annex A

Part 2 – 17 in detail

Part 2

Test protocol for Protection of Shopping and Storage spaces.
This part will be based on a VdS protocol.

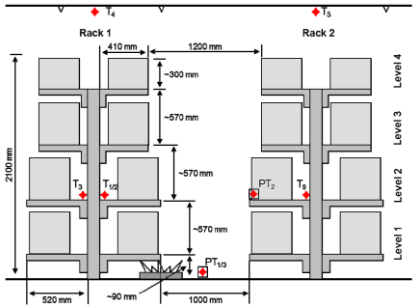
- **Scope: Shopping and Storage.**
- **Storage types like what one know from sprinklers.**
- **Approval based on performance of sprinkler versus WM. Meaning sprinkler tests are always mandatory.**
- **OH-3 sales, storage and technology areas enclosed by OH-1 areas.**

Restrictions and limitations:

- Sale of furniture with foamed plastics alone is not allowed
- A special proof is necessary for extensive open areas (e.g. malls)
- No computer rooms / IT rooms
- No storage of flammable liquids, gases etc.
- Room protection only (no content or local application protection)
- Permitted storage height depends on type of storage: Cat. I = 3,00 m, Cat. II = 2,60 m, Cat. III = 1,70 m and Cat. IV = 1,20 m
- Chaotic storage of materials with exposed plastic surfaces amounting to > 25% without cardboard is permitted up to 5% of the total storage or capacity

Storage types ST1 - ST4:
Maximum dimensions of areas: 120 m² (design of area of operation for these areas: area size plus 50%, however 180 m² max.)

Storage types ST5 - ST6:
Design of area of operation for these areas 216 m² (in accordance with VdS CEA 4001)



Protection of selected OH-3 sales, storage and technology areas enclosed by OH-1 areas.
The area in question shall be enclosed by enclosure surfaces made of non-combustible materials (no fire protection classification). Outside of the solid walls a row of sprinklers shall be installed which have the same parameterisation / design as those inside the area.
The additional sprinkler row outside the area will not be required, if the walls are fire-resistant (F 90), exterior walls of the building, or contain other protected areas than those specified above.

Part 3

Test protocol for Protection of office and accommodation spaces. This will be based on a VdS protocol.

- Scope: Office and accommodation areas.
- Requires two different test set-ups.
- Approval based on performance of sprinkler versus WM.
- Covers a wide range of applications.

Accommodation areas:

The following areas are considered to be covered by the accommodation areas fuel package in accordance with clause 5.3:

- hotel rooms
- rooms in hospitals, nursing homes, senior citizens residences
- flats
- recreation areas

Office spaces: The following areas are considered to be covered by the office and school fuel package in accordance with clause 5.2:

- cellular offices and open plan offices
- areas with counters
- restaurants and kitchens
- rooms for data processing

  Note: In case the rooms for data processing are protected by means of water mist sprinkler systems under the ceiling, these cannot be assumed to fight fires inside of server cabinets or the like.
- public areas in buildings of low fire load
- escape routes or other corridors
- training classrooms
- churches
- museums

Part 4

Test protocol for Protection of HC1 areas. This will be based on the FM protocol 5560, Appendix G, Non Storage Occupancies for Automatic Nozzle Systems

- **Scope: Office and accommodation areas.**
- **Requires 3 different test set-ups.**
- **Approval based on predefined requirements such as temperature and damage control.**
- **Covers a wide range of applications.**
- **Testing according part 4 and part 7 are very similar.**

FM Global
Property Loss Prevention Data Sheets 3-26

Table 4. Nonstorage, Non-Manufacturing Occupancies and their Associated Fire Hazard Categories (cont'd)

Occupancy	*Description*	*Hazard Category*	*Considerations*
Leisure Facilities & Public Assembly	- Museums and Monuments - Restaurants (Seating Areas) - Gyms - Places of Worship - Ski Lift Station - Zoo / Aquarium - Auditoriums - Aquatic Center (Swimming Pool/ Spa) - Theatres - Cinemas - Convention Centers - Theme Parks - Libraries	HC-1	- Theaters, auditoriums, and casinos may sometimes qualify as HC-1 occupancies when ordinary combustibles loading is minimal, or the construction of the building is noncombustible. For example, casino areas with ceilings under 30 ft (9 m) high and only lined with slot machines would qualify as HC-1. Auditoriums or theaters, including staging practically empty of ordinary combustibles, would also qualify. Consider backstage and below stage areas without storage to be HC-2.
	- Sport Arena - Theaters - Casinos - Night Clubs	HC-2	- Large convention centers have the potential to display products that have high amounts of plastic and/or have concealed spaces.
	- Exhibition Halls - Theatre: Backstage and Below Stage Areas. - Convention Centers	HC-3	

1. Restricted Approval
   A water mist system shall successfully complete fire tests G.4.1 and G.4.2 for Approval in restricted areas. Restricted Approval may apply to water mist systems using upright, pendent, or sidewall nozzles, including flush, recessed, and concealed pendent and sidewall nozzles.
2. Unrestricted Approval
   A water mist system evaluated for unrestricted areas shall successfully complete all five fire performance tests, G.4.1 through G.4.5. Unrestricted Approval may apply to water mist systems using upright or pendent nozzles, including flush, recessed, and concealed pendent nozzles. Unrestricted Approval is not permitted for water mist systems using sidewall nozzles.

Part 5

Test protocol for Car garages. This will be based on a VdS protocol.

- **Scope: Car garages.**
- **Requires use of real cars.**
- **Approval based on performance of sprinkler versus WM. Meaning sprinkler tests are always mandatory.**
- **Automatic car stackers etc. is not covered.**

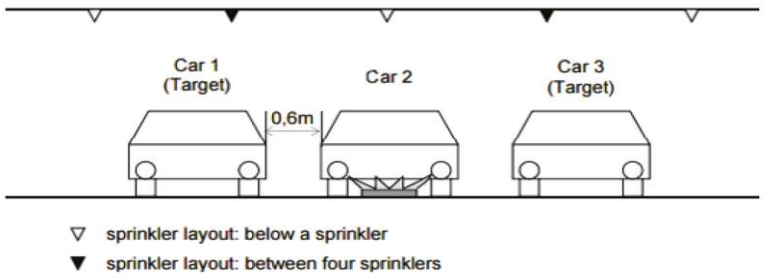


Figure 4-1: Assembly of fire loads and position of ignition source

These tests are carried out to evaluate the extinguishing effectiveness of water mist systems for the protection against OH2 risks for the application car park garages in the context of the approval and testing procedure in accordance with VdS 2562.

In the tests specified in this concept the water mist system to be approved shall have at least equal extinguishing effectiveness as a sprinkler system.

These tests can only be applied for the evaluation of the extinguishing effectiveness of water mist systems for the application OH2 car park garages. It is not possible to apply them to other OH2 risks or higher room heights.

In case of a positive result of the tests the water mist system to be approved can be approved for the protection against the following OH2 risks:

Protection of non-automatic, fully enclosed garages and underground garages.

Part 6

Test protocol for False ceilings. This will be based on a VdS protocol.

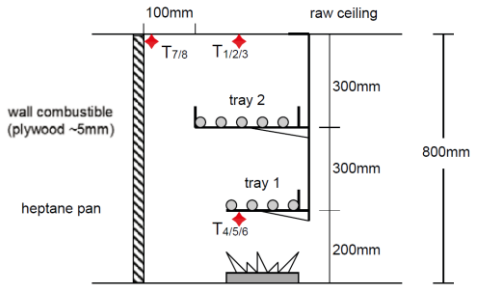
- **Scope: False ceilings and floors.**
- **Requires Only one test set-up.**
- **Approval based on performance of sprinkler versus WM. Meaning sprinkler tests are always mandatory.**
- **Covers false ceilings between 300 and 800mmin OH-1.**

Tests:

The test assembly simulates a false floor / false ceiling in the test scale. The following scenarios are tested in different test procedures:

- Test 1: Free-burn test, fire without extinguishment
- Test 2: Ignition between 2 sprinklers as reference test (Spr1)
- Test 3: Ignition between 2 nozzles (Fein1)
- Test 4: Ignition between 2 nozzles (Fein2), confirmatory test

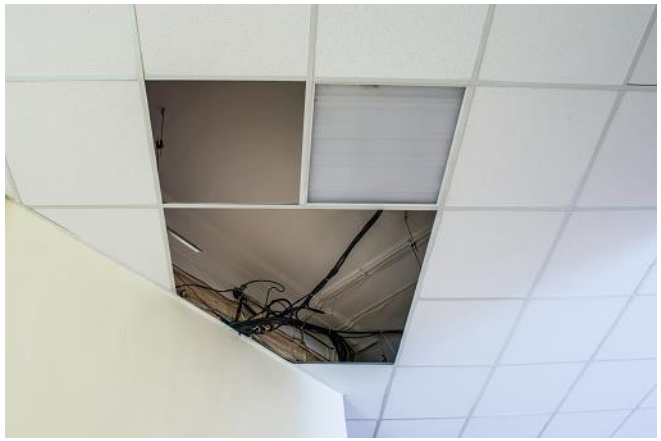
False ceilings and false floors between 300 mm and 800 mm
(Raw ceiling/false floor including supports non-combustible, cables with density < 40% of the footprint and fire load > 12,6 MJ/m²)



The test scenario is based on a typical false ceiling comprising the appropriate fire load in terms of cabling.

The test assembly shall include the following elements:

a) housing
b) cable trays
c) cables as fire load
d) heptan pan as ignition source



Part 7

Protection of low hazard occupancies. This will be based on a BS standard.

- **Scope: Low hazard occupancies.**
- **Requires 3 different test set-up.**
- **Approval based on predefined requirements such as temperature and damage control.**
- **Covers a wide range of applications.**
- **Testing according part 4 and part 7 are very similar.**

This part of BS 8489 describes tests and specifies requirements for industrial and commercial watermist systems for the protection of low hazard occupancies as defined in BS 8489-1.

This part of BS 8489 is applicable to ceiling heights up to 5 m.

category I system
system that covers rooms up to and including 37 m^2 containing low hazard fire loads

category II system
system that covers rooms above 37 m^2 containing low hazard fire loads

category III system
system that covers rooms containing low hazard fire loads

low hazard occupancy
non-storage, non-manufacturing occupancy where the quantity and/or combustibility of the content is low and fires with relatively low rates of heat release are expected, with maximum fuel loads and obstructions as indicated in **4.7** to **4.10**

Part 8

Protection of Machinery space. This protocol is based on the FM Test Protocol, Appendix E, volumes exceeding 260 m³.

- **Scope: Machinery spaces exceeding 260m³.**
- **Requires 1 test set-up, different fires.**
- **Approval based on predefined requirements such as temperature and extinguishment.**
- **Covers Machinery spaces within the tested volume and limited ventilation.**

Protection of machinery in enclosures with volumes exceeding 9175 ft³ (260 m³), Appendix E. This application includes enclosures with machinery such as internal combustion engines (excluding engine test cells), oil pumps, oil tanks, fuel filters, generators, transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators (reference FM Global Datasheet 5-23), and other similar equipment using liquid hydrocarbon fuel and/or hydraulic, heat transfer, and lubrication fluids with volatility less than or equal to heptane; enclosures with incidental use or storage of hydrocarbon ignitable liquids (also known as flammable liquids) of not more than two 55 gal (208 L) drums. All hazards included under the scope of this total compartment application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater. For primary protection consideration, see Section 1.9, Definitions, "Primary Protection", and consult the FM Global Property Loss Prevention Data Sheet for the recommended protection of the specific hazard in the applicable occupancy.

Internal Combustion Engines
Oil pumps
Fuel filters
Generators
Transformer vaults
Gear boxes
Drive shafts
Lubricated skids
Diesel engine driven generators
Combustion turbines

Part 9

Protection of Machinery space. This protocol is based on the FM Test Protocol 5560, Appendix C. Fire tests for water mist systems for the protection of machinery in enclosures with volumes not exceeding 260 m³.

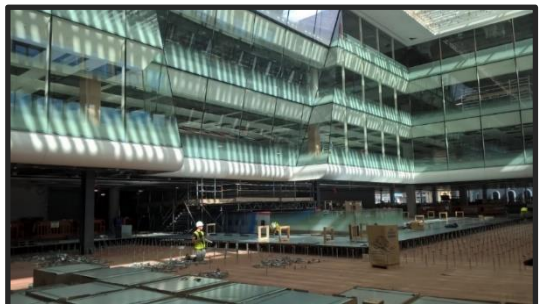
- **Scope: Machinery spaces not exceeding 260m³.**
- **Requires 1 test set-up, different fires.**
- **Approval based on predefined requirements such as temperature and extinguishment.**
- **Covers Machinery spaces within the tested volume and limited ventilation.**
- **Is a good basis for Stand alone systems.**

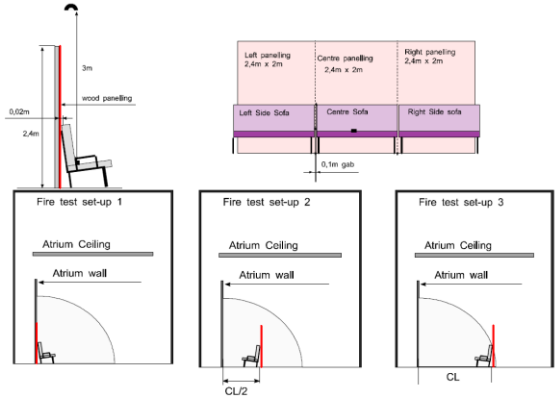
Protection of machinery in enclosures with volumes not exceeding 9175 ft^3 (260 m^3), Appendix C. This application includes rooms with machinery such as internal combustion engines (excluding engine test cells), oil pumps, oil tanks, fuel filters, generators (reference FM Global Datasheet 5-23), transformer vaults, gear boxes, drive shafts, lubrication skids, diesel engine driven generators, and other similar machinery using fuel and/or lubrication fluids with volatilities less than or equal to heptane. All hazards included under the scope of this total compartment application shall be protected for a minimum of twice the longest time to extinguish the test fires, the time to shut down process equipment, or 10 minutes, whichever is greater.

Part 10

Protection of Atriums. This will be based on the Danish Fire Laboratories Fire Test Method: DFL TM 70111-04.

- **Scope: Atriums, areas with high ceiling heights, horizontal protection.**
- **Requires 1 test set-up.**
- **Approval based on predefined requirements such as damage.**
- **Covers atriums of unlimited height and areas as tested in regards of max. coverage from walls.**





Scope:
The scope of DFL Method 70111-04 is to test the fire suppression performance of systems for fire protection of atriums.

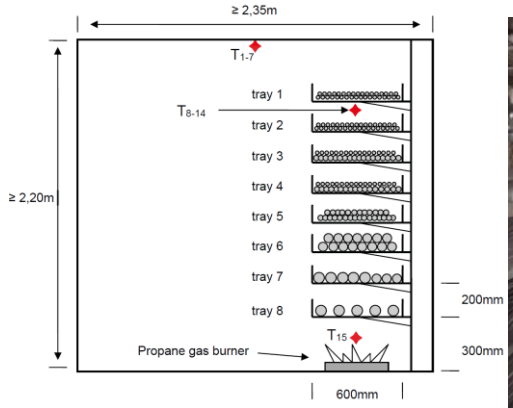
The method coves water based fire protection systems, which are characterized by spraying a water based fire suppression agent from atrium walls into to the atrium volume.
Examples of such systems are: Sprinkler systems with open or closed sprinkler nozzles, and water mist systems with open or closed nozzles.

The test method are suitable for absolute testing of the fire suppression systems, without comparison to other systems, as well as for comparison of fire control and fire suppression capabilities of different fire protection systems.

Part 11

Test protocol for Cable tunnels. This will be based on a VdS protocol. Protection of Cable ducts.

- **Scope: Cable tunnels/ducts.**
- **Requires 1 test set-up.**
- **Approval based on predefined requirements such as damage to cables and temperatures measurements.**
- **Covers cable tunnels/ducts with dimensions and wind velocities as tested.**



Any fire loss at the test assembly shall be quantified. The following issues shall be taken into account in the evaluation:

1. Determination of the fire loss:
   - damaged cables on each cable tray
2. Determination of the temperature sequences:

   The temperature curves measured during the test shall be averaged over 30 s (maximum interval between measurements 1 s).

   The tests have been passed, when the following applies:

   - The temperatures in the fire test room shall be decreased below 100°C within 5 minutes of the activation of the extinguishing system.
   - Not later than 15 minutes after activation of the extinguishing system no flames or embers shall be visible at any of the cables. This is checked visually and by means of a thermographic camera[1].
   - After finishing the test, the cables of each cable tray shall not be damaged over a length of 1 m each on both sides of the cable tray.

Part 12

Test protocol for Commercial deep fat cooking fryers. This will be based on the ISO 15371 Ships and marine technology-Fire extinguishing systems for protection of galley deep-fat cooking equipment.

- **Scope: commercial deep fat cooking fryers.**
- **Requires 1 test set-up with several different tests.**
- **Approval based on predefined requirements such as duration of the fire ball, extinguishment and cooling of the fat.**
- **Covers commercial deep fat fryers with the same amount of fat as tested.**

1 Scope

This International Standard applies to the design, testing, and operation of pre-engineered fire extinguishing systems to protect the galley hoods, ducts, fryers and other grease-laden appliances.

Pre-engineered fire-extinguishing system units are also required to comply with requirements for the construction and components performance as applicable to specific types, designs, sizes and arrangements. This International Standard also provides minimum requirements for the testing and evaluation of components.

A product that contains features, characteristics, components, materials or systems that are new or different from those covered by the requirements in this International Standard and that involve a risk of fire, electric shock, or injury to persons, shall be evaluated using the appropriate additional component and end-product testing.

NOTE Only deep-fat cooking equipment, among the types of galley cooking equipment covered by this International Standard, are required by SOLAS chapter II-2 Regulation 10.6.4 to have fixed fire-extinguishing systems.

5.1.1.2 When tested with a cooking appliance, the extinguishing system unit shall:

a) result in the flame in the appliance being completely extinguished in one minute or less;

b) within 10 seconds of the release of the system, not cause a fire ball over the appliance that is larger than the initial fire;

c) for deep fat fryers, woks and ranges, not permit reigniting of the grease for 20 minutes or until the temperature of the grease decreases at least 33,3 °C below its observed auto-ignition temperature, whichever is longer; and

d) for all appliances other than deep fat fryers, woks and ranges, not permit re-ignition of the grease for five minutes.

3.2.7 The liquid grease in the fryer shall be heated by its heating source until auto-ignition occurs. If the grease temperature reaches 363 °C and the grease still has not ignited, it shall be ignited manually. The fire shall burn freely with the fryer's heating source remaining on for a period of not less than one minute. After the free-burn period, the heating source shall be shut off and the extinguishing system unit shall be manually discharged.

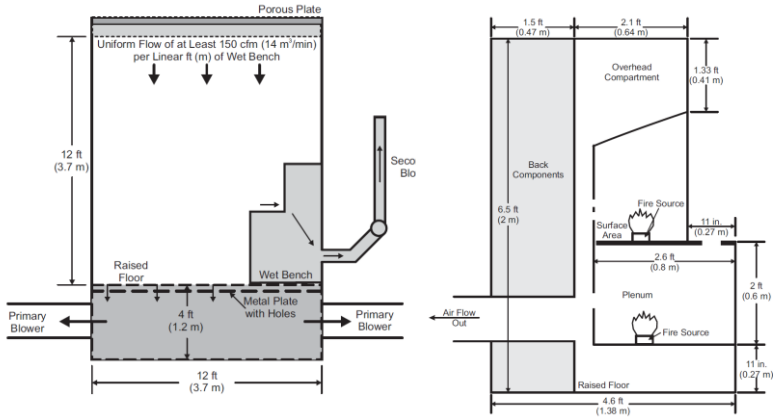
Part 13

Test protocol for Wet Benches and Similar. This will be based on the FM 5560, Appendix H. Fire test for Wet benches and other similar processing equipment for open nozzle systems.

- **Scope: Wet benches and similar.**
- **Requires 1 test set-up with several different tests like ventilated/unventilated, different pool and splash tests.**
- **Approval based on extinguishment within 60 sec from release of WM system**
- **Covers Wet benches and similar equipment.**

Table H.4.6 Ignitable Liquid (also Known as Flammable Liquid) Pool Fuel Properties

Formula	*Flash Point - Closed Cup*		*Flash Point - Open Cup*		*Burning Rate Nominal 6 in. (150 mm) Diameter Pool Fire*	
	°F	*(°C)*	*°F*	*(°C)*	*kW*	*(BTU/sec)*
Acetone (CH3)CO	0	(-17.8)	15	(-9.4)	18	(17.1)
Isopropyl Alcohol (IPA) (CH3)2CHOH	53	(11.7)	60	(15.6)	12	(11.4)
Heptane CH3(CH2)5CH3	25	(-3.9)	30	(-1.1)	58	(55.0)



H.4 VENTILATED SUBSURFACE (PLENUM) FIRE TESTS (SEE FIGURES H-7 AND H-8)

H.4.1 Nominal 4 in. (102 mm) Diameter Polypropylene Pool Fire

Criterion:	Fire extinguishment in 60 seconds or less (timed from system activation)
Fuel:	The polypropylene fuel shall consist of polypropylene beads, approximately 0.08 to 0.12 in. (2 to 3 mm) in diameter, filled to a depth of 0.75 in. (19 mm) in a 4 in. (102 mm) diameter dish. Three 0.5 by 2 in. (13 by 51 mm) polypropylene coupons shall be placed on top of the beads (see Figure H-10).
Fire Location:	The solid polypropylene fuel shall be placed within the subsurface space at a location chosen by FM Approvals.
Fire Preburn Time:	Minimum 30 seconds
Test Procedure:	The fuel shall be ignited using a 12 V, 9 A glow plug. Ignition will typically occur within 15 to 30 seconds, but the glow plug should remain on for a period of time to ensure ignition of the fuel. The burning shall be allowed to reach a steady state condition. An initial slow fire growth period (20 to 30 minutes) will occur, followed by rapid growth and the development of a steady state fire within a period of approximately 3 minutes. Once steady state burning is achieved, the preburn time shall begin, and the water mist system should be manually activated subsequent to the required preburn time.

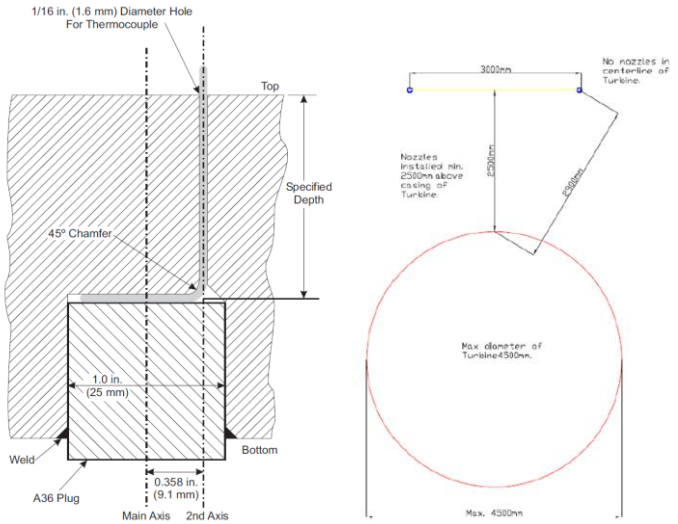
G. General dish specifications:

The dishes shall be standard polystyrene, circular Petri dishes, with diameters of 4 in. (102), 6 in. (152 mm), 8 in. (203 mm), 10 in. (254 mm), and 12 in. (305 mm), and a height equal to 1 in. (25 mm). For the polypropylene fuel fires, the polypropylene beads shall be filled to a depth of 0.75 in. (19 mm), and the polypropylene coupons shall be placed on top of the beads. For the ignitable liquid (also known as flammable liquid) fuel fires, the fuel shall be filled to a depth of 0.75 in. (19 mm).

Part 14

Protection of gas turbines. This will be based on the FM Test Protocol 5560, Appendix F. Fire tests for water mist systems for the protection of gas turbines in enclosures with volumes exceeding 260 m³.

- **Scope: Gas turbines in enclosures exceeding 260m³.**
- **Requires 2 test set-up with insulation material involved + a cooling test.**
- **Approval based on extinguishment and suppression of the fires. Standoff distance found through the cooling test.**
- **Covers insulated and uninsulated gas turbines.**



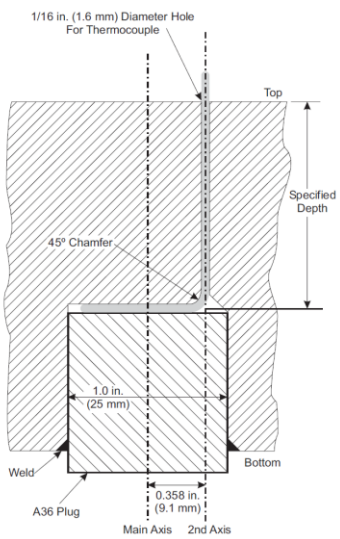
To determine the cooling rate of the combustion turbine steel plate mockup, caused by the discharge of the water mist system, three thermocouples should each be embedded near the center of the plate at approximately 0.5 in., 1.0 in., and 1.50 in. (12 mm, 25 mm, and 38 mm) below the plate's top surface. The three inconel-sheathed thermocouples should be embedded in the plate by removing cylindrical plugs from the plate.

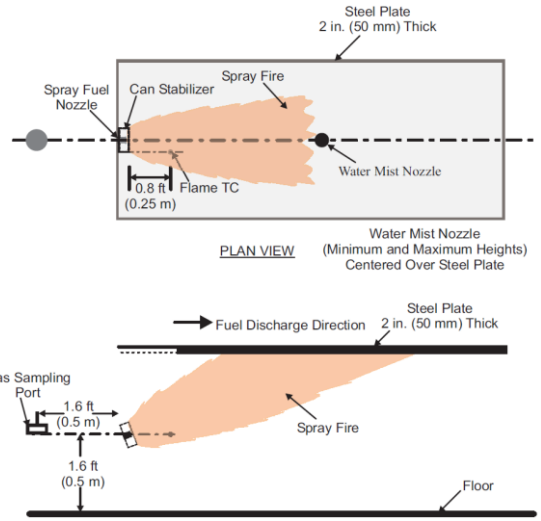
The thermocouples should be inserted to allow the thermocouple wire to follow a horizontal path of sixteen thermocouple diameters in length, thus reducing errors due to the vertical temperature gradient in the plate. A heat conductive and electrically insulating sealant should be applied, and the steel cylindrical plugs should be replaced and welded to the plate around the top periphery of the plugs. This can be accomplished by using a 1.0 in. (25 mm) diameter miller tool, installing the thermocouples, and then refilling the hole welded 1.0 in. (25 mm) round bar stock (see Figure F-6).

Part 15

Protection of gas turbines. This will be based on the FM Test Protocol 5560, Appendix D. Fire tests for water mist systems for the protection of machinery in enclosures with volumes not exceeding 260 m³.

- **Scope: Gas turbines in enclosures not exceeding 260m³.**
- **Requires 2 test set-up with insulation material involved + a cooling test.**
- **Approval based on extinguishment and suppression of the fires. Standoff distance found through the cooling test.**
- **Covers insulated and uninsulated gas turbines.**





various steel table and sheet metal surfaces to permit water run-off. For ease of conducting the spray cooling test, it is recommended to either butt up or simply attach the table and sheet metal extension surfaces with screw fasteners.

The space below the plate is partially shielded from water mist using 3.3 ft high by 1.6 ft wide (1 m by 0.5 m) sheet metal baffles. The side baffles should be of 22 gauge (0.85 mm thick) galvanized sheet metal construction and removable. They may be installed on support legs and kept in place by being pinched between the underside of the steel plate table and the 45 degree angle extensions and the floor for ease of removal. Placement of additional baffles or obstructions may be needed to prevent the direct impact of mist on the pool or spray test fires, at the sole discretion of FM Approvals.

To determine the cooling rate of the combustion turbine steel plate mockup, caused by the discharge of the water mist system, three thermocouples should each be embedded near the center of the plate at approximately, 0.5 in., 1.0 in, and 1.50 in. (12 mm, 25 mm, and 38 mm) below the plate's top surface. The three inconel-sheathed thermocouples should be embedded in the plate by removing cylindrical plugs from the plate.

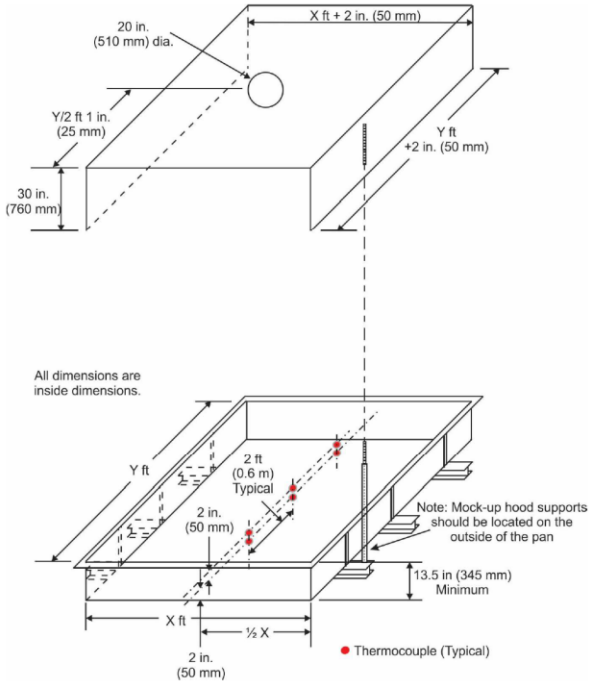
The thermocouples should be inserted to allow the thermocouple wire to follow a horizontal path of sixteen thermocouple diameters in length, thus reducing errors due to the vertical temperature gradient in the plate. A heat conductive and electrically insulating sealant should be applied, and the steel cylindrical plugs should be replaced and welded to the plate around the top periphery of the plugs. This can be accomplished by using a 1.0 in. (25 mm) diameter miller tool, installing the thermocouples, and then refilling the hole with welded 1.0 in. (25 mm) round bar stock (see Figure D-5).

The underside curvature of the turbine is simulated with 22 gauge (0.85 mm thick) galvanized sheet metal directed upward at an angle of 45 degrees on either side of the steel plate and horizontal sheet metal extension surface. These side pieces also extend longitudinally the entire length of the enclosure, rising to a height of 4.9 ft (1.5 m) above the horizontal sheet metal and steel plate surfaces. The total width of the mockup is 6.6 ft (2.0 m). There should be a minimal gap between the

Part 16

Protection of Industrial oil cookers. This is based on the FM Test Protocol 5560, Appendix J. Fire tests for water mist systems for the protection of Industrial Oil Cookers for Open Systems.

- **Scope: Industrial oil cookers.**
- **Requires 3 different size test set-ups,1/3, 2/3 and 1/1.**
- **Approval based on extinguishment within 60 sec and cooling of the oil beneath its flashpoint. Also splash of oil due to the release of the system is assessed**
- **Covers Industrial oil cookers up to the tested dimensions.**



Protection of industrial oil cookers, Appendix J. Application of the water mist system is limited to the protection of the industrial oil cookers only, and does not include the protection of other equipment such as exhaust ducts, heaters, heat exchangers, and food processing areas, unless tested for these applications. Consideration of the application and use of nozzle protection caps to prevent or reduce the amount of nozzle contamination should be given and the use of such caps should be included in the fire test and nozzle performance test requirement programs. This local application does not include the protection of other equipment such as exhaust air ducts, heaters, heat exchangers, and food processing or food preparation areas. Consultation with FM Global Property Loss Prevention Data Sheet Numbers 4-2, *Water Mist Systems*, and 7-20, *Oil Cookers*, is required for installation of these systems.

The performance tests should be comprised of three stages, each stage using a different size industrial oil cooker mockup. At each stage, there shall be two tests; one to evaluate the fire extinguishment and cooling performance with the hood down and the other test with hood up.

Stage 1: Tests conducted with the smallest mockup of dimensions X wide by Y long, such that Y is greater than or equal to X. These dimensions shall be specified by the manufacturer.
Stage 2: Tests conducted with a mockup of dimensions X wide by 2Y long.
Stage 3: Tests conducted with a mockup of dimensions X wide by 3Y long.

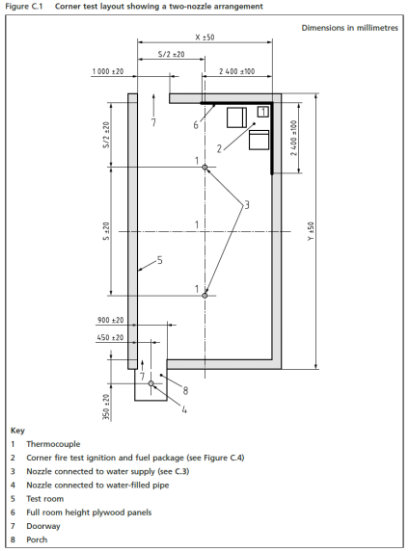
The water mist system shall successfully complete both performance tests at each stage before it can be considered for an Approval for the protection of an industrial oil cooker up to the size tested. Testing may not proceed to the next stage without successful completion of the tests in the previous stage.

Part 17

Protection of residential occupancies. This will be based on the BS 8458-1:2015.Fixed fire protection systems-Residential and Domestic water mist systems.

- **Scope: Residential occupancies.**
- **Requires 1 test set-up with some different located fires.**
- **Approval based on predefined requirements such as temperature control and target nozzles.**
- **Covers domestic and domestic applications.**

Figure C.1 Corner test layout showing a two-nozzle arrangement



Key
1 Thermocouple
2 Corner fire test ignition and fuel package (see Figure C.4)
3 Nozzle connected to water supply (see C.3)
4 Nozzle connected to water-filled pipe
5 Test room
6 Full room height plywood panels
7 Doorway
8 Porch

Scope

This British Standard gives recommendations for the design, installation, water supplies, commissioning, maintenance and testing of watermist systems with automatic nozzles installed in residential and domestic occupancies up to a maximum ceiling height of 5.5 m. It primarily covers watermist systems used for life safety, but might also provide property protection.

The recommendations of this British Standard are also applicable to any addition, extension, repair or other modification to a residential or domestic watermist system.

The British Standard does not cover watermist systems in industrial and commercial buildings. Recommendations for these systems are given in DD 8489-1 [1].

Annex A

EN 14972-1:2020, Annex A

In accordance with this annex, it is possible to:

Develop a test method for a specific application to any system type.

Authorities involved in the project, accepts the protocol.

Conduct the fire tests described in the developed standard.

Get the test results evaluated and documented in a test report.

A test laboratory shall conduct the fire tests.

Often the AHJ is involved throughout the entire test project.

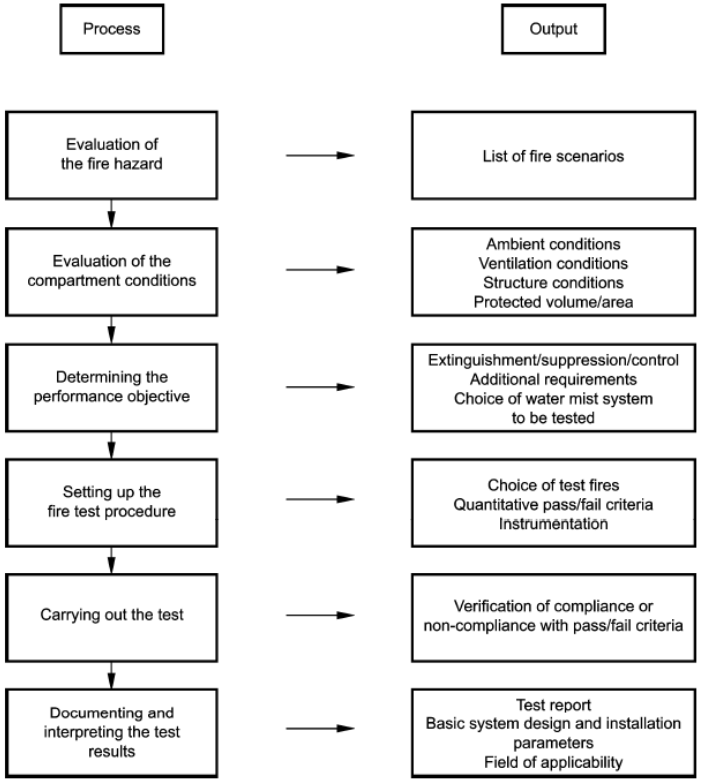
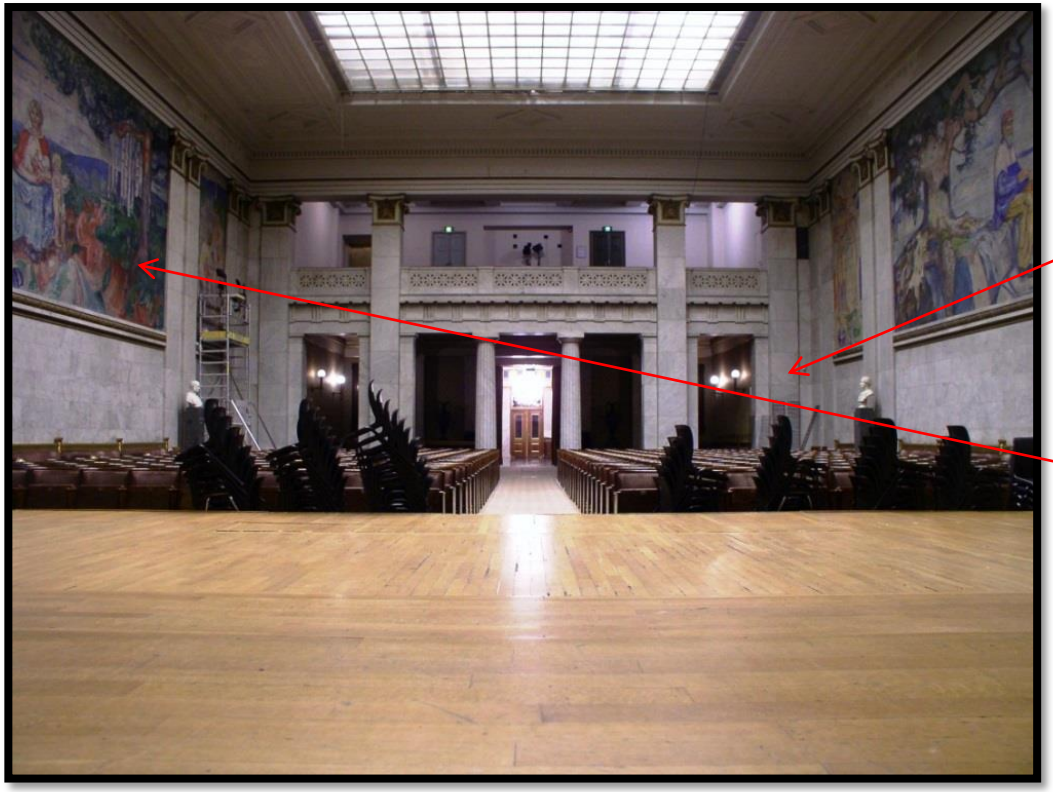


Figure B.1 — Process of developing a fire test procedure

Annex A in use.

Oslo university
Aula



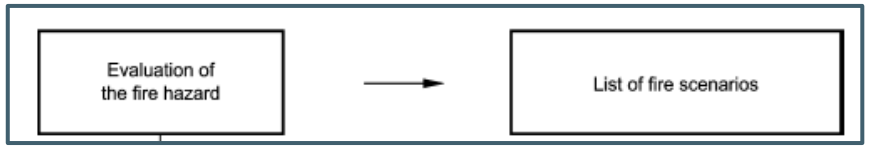
Challenges:

Fire protection required due to evacuation of people in case of fire.

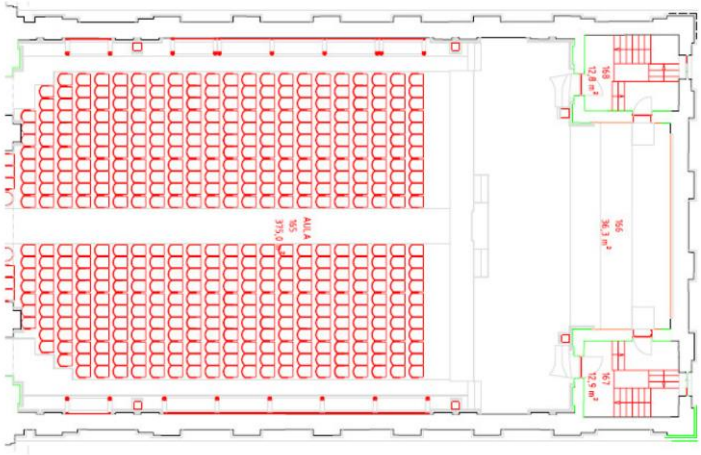
Room was not tight, people is present, and large quantities of gas would be required, so gas couldn't be used.

Paintings of significant value for Norwegian heritage. So, no sprinkling allowed due to fear of damage.

Annex A in use.



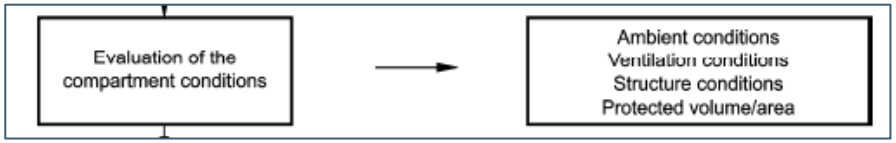
Many people, large seating areas and need for fast activation of system in case of fire.



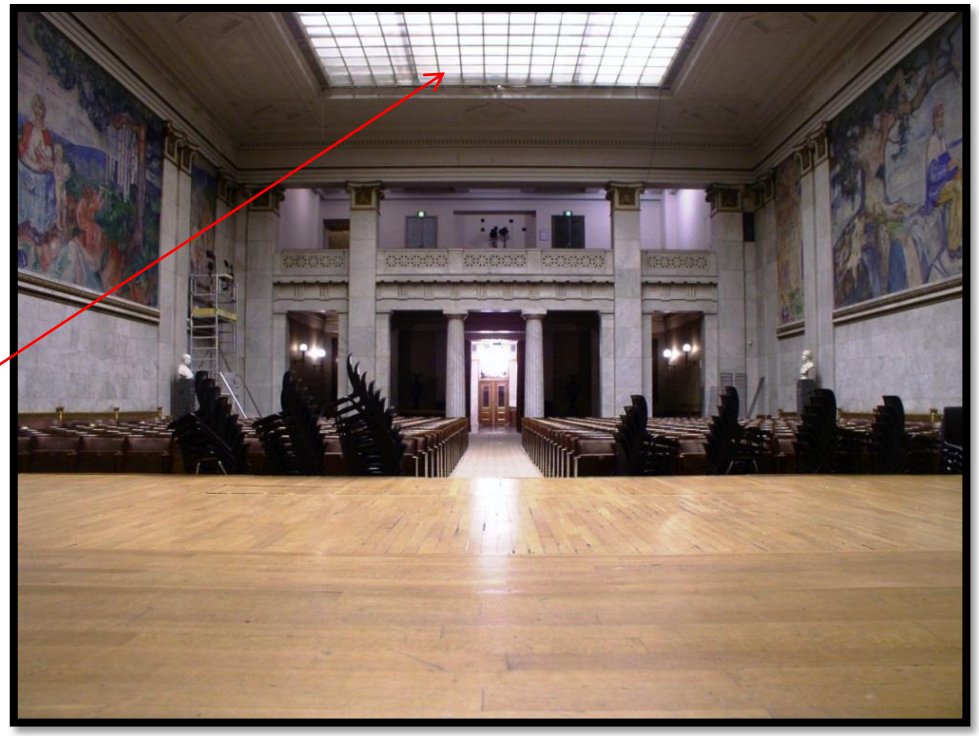
Also, considerations regarding eventual damage to paintings on the wall caused by the system.

Application example: Oslo University Aula

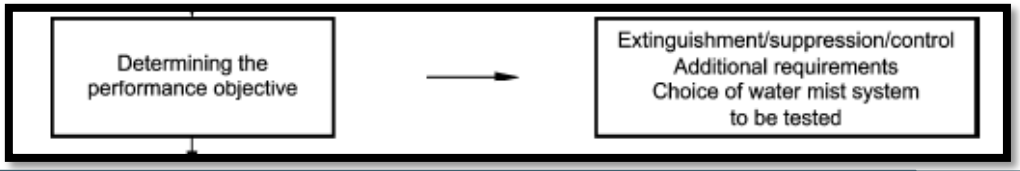
Annex A in use.



Large room with very high ceilings, difficult to protect with automatic nozzles due to delay of activation.



Annex A in use.



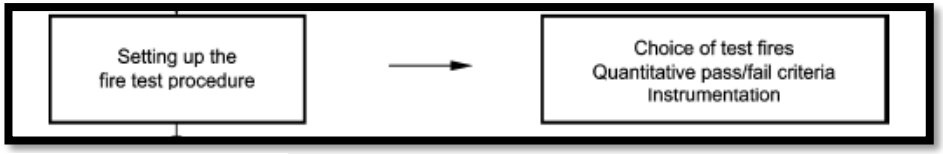
Aim:

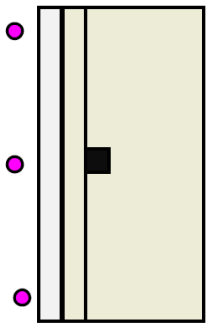
Control, extinguishment, or fire spread?

Also:

Indication of what system to use.

Annex A used.

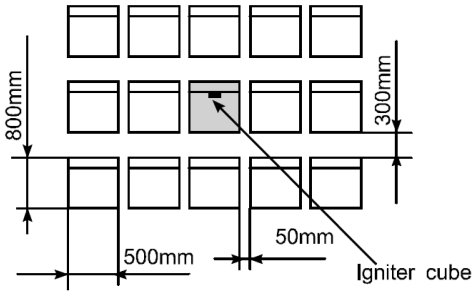




Nozzles are hidden 3 cm behind sumulated wall sofa backrest.

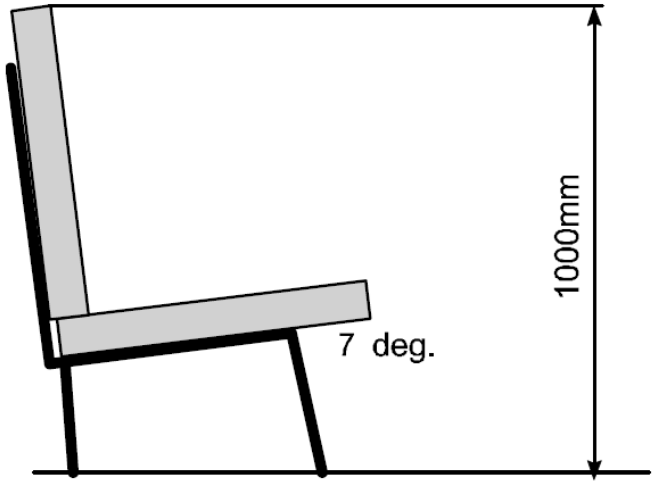
Ignition cupe are positioned in centre of sofa and between two active nozzles

Temperatures are measured 3m above floor, and 15 cm behind the location of the ignition cube.



Chair arrangement Open seat area fire

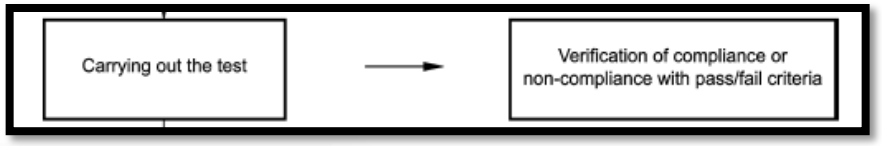
DFL Firetest procedure
No.: 90805-01
Method to evaluate fire protection performances of active fire protection systems for fixed installed fire protecting of concert halls and similar locations seating multiple spectators in individual chairs and sofas.

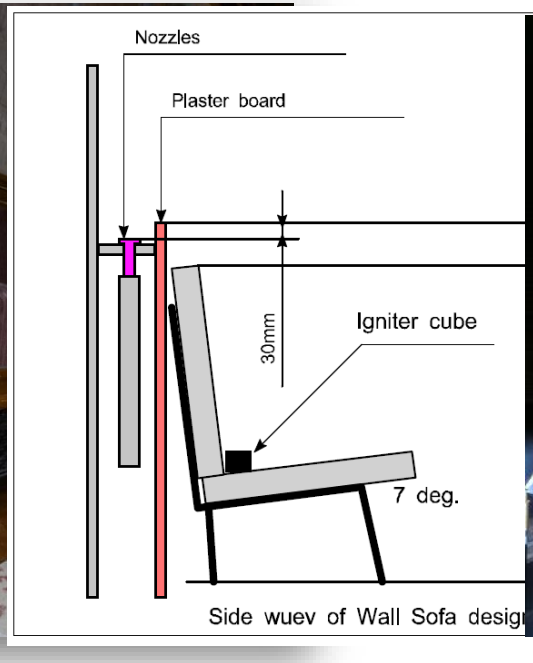


Chair & sofa design

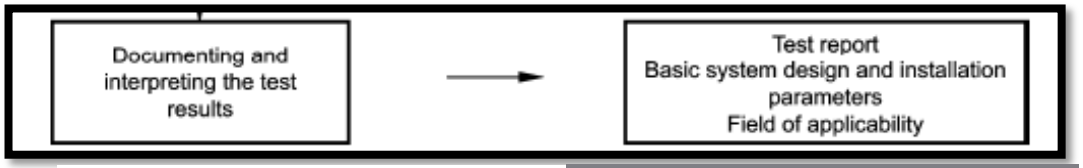
Chairs and sofas present, so the obvious choice was using well known fuels from other accepted standards.

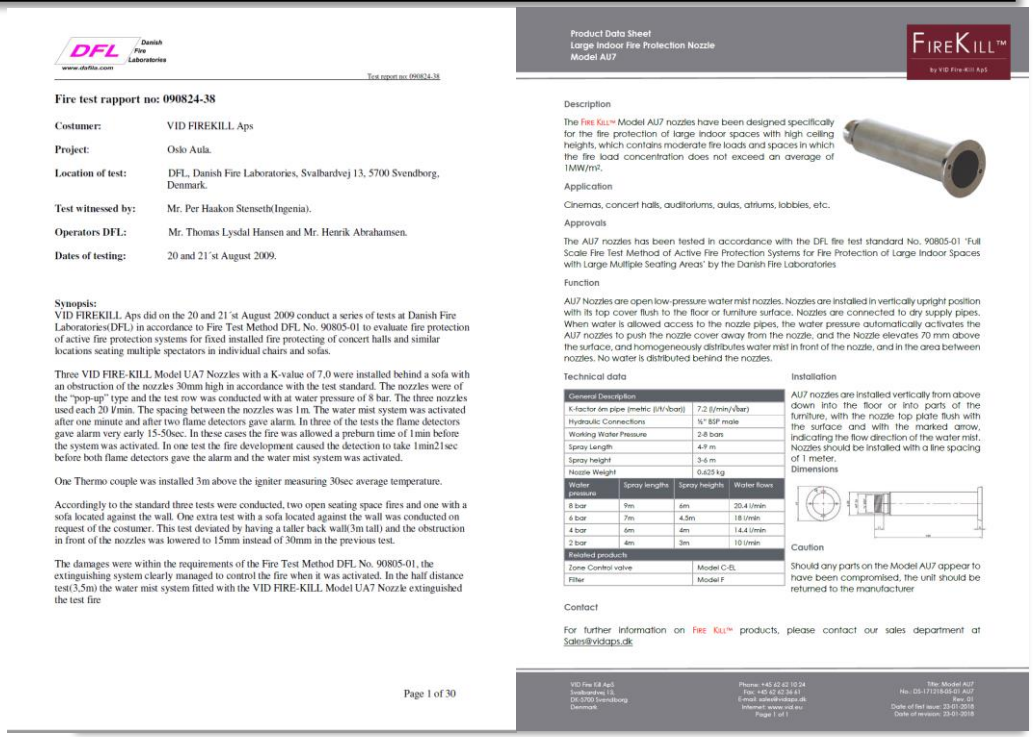
Annex A in use.





Annex in use.





DFL Danish Fire Laboratories
www.dflfire.com

Test report no: 090824-38

Fire test rapport no: 090824-38

Costumer: VID FIREKILL Aps

Project: Oslo Aula.

Location of test: DFL, Danish Fire Laboratories, Svalbardvej 13, 5700 Svendborg, Denmark.

Test witnessed by: Mr. Per Haakon Stenseth(Ingenia).

Operators DFL: Mr. Thomas Lysdal Hansen and Mr. Henrik Abrahamsen.

Dates of testing: 20 and 21´st August 2009.

Synopsis:
VID FIREKILL Aps did on the 20 and 21´st August 2009 conduct a series of tests at Danish Fire Laboratories(DFL) in accordance to Fire Test Method DFL No. 90805-01 to evaluate fire protection of active fire protection systems for fixed installed fire protecting of concert halls and similar locations seating multiple spectators in individual chairs and sofas.

Three VID FIRE-KILL Model UA7 Nozzles with a K-value of 7,0 were installed behind a sofa with an obstruction of the nozzles 30mm high in accordance with the test standard. The nozzles were of the "pop-up" type and the test row was conducted with at water pressure of 8 bar. The three nozzles used each 20 l/min. The spacing between the nozzles was 1m. The water mist system was activated after one minute and after two flame detectors gave alarm. In three of the tests the flame detectors gave alarm very early 15-50sec. In these cases the fire was allowed a preburn time of 1min before the system was activated. In one test the fire development caused the detection to take 1min21sec before both flame detectors gave the alarm and the water mist system was activated.

One Thermo couple was installed 3m above the igniter measuring 30sec average temperature.

Accordingly to the standard three tests were conducted, two open seating space fires and one with a sofa located against the wall. One extra test with a sofa located against the wall was conducted on request of the costumer. This test deviated by having a taller back wall(3m tall) and the obstruction in front of the nozzles was lowered to 15mm instead of 30mm in the previous test.

The damages were within the requirements of the Fire Test Method DFL No. 90805-01, the extinguishing system clearly managed to control the fire when it was activated. In the half distance test(3,5m) the water mist system fitted with the VID FIRE-KILL Model UA7 Nozzle extinguished the test fire

Page 1 of 30

Product Data Sheet
Large Indoor Fire Protection Nozzle
Model AU7

FIREKILL™
By VID Fire-Kill ApS

Description

The FIRE KILL™ Model AU7 nozzles have been designed specifically for the fire protection of large indoor spaces with high ceiling heights, which contains moderate fire loads and spaces in which the fire load concentration does not exceed an average of 1MW/m².

Application

Cinemas, concert halls, auditoriums, aulas, atriums, lobbies, etc.

Approvals

The AU7 nozzles has been tested in accordance with the DFL fire test standard No. 90805-01 "Full Scale Fire Test Method of Active Fire Protection Systems for Fire Protection of Large Indoor Spaces with Large Multiple Seating Areas' by the Danish Fire Laboratories

Function

AU7 Nozzles are open low-pressure water mist nozzles. Nozzles are installed in vertically upright position with its top cover flush to the floor or furniture surface. Nozzles are connected to dry supply pipes. When water is allowed access to the nozzle pipes, the water pressure automatically activates the AU7 nozzles to push the nozzle cover away from the nozzle, and the Nozzle elevates 70 mm above the surface, and homogeneously distributes water mist in front of the nozzle, and in the area between nozzles. No water is distributed behind the nozzles.

Technical data

General Description	
K-factor 6m pipe (metric (l/t/√bar))	7.2 (l/min/√bar)
Hydraulic Connections	¼" BSP male
Working Water Pressure	2-8 bars
Spray Length	4-9 m
Spray height	3-6 m
Nozzle Weight	0,625 kg

Water pressure	Spray lengths	Spray heights	Water flows
8 bar	9m	6m	20.4 l/min
6 bar	7m	4.5m	18 l/min
4 bar	6m	4m	14.4 l/min
2 bar	4m	3m	10 l/min

Related products	
Zone Control valve	Model C-EL
Filter	Model F

Installation

AU7 nozzles are installed vertically from above down into the floor or into parts of the furniture, with the nozzle top plate flush with the surface and with the marked arrow, indicating the flow direction of the water mist. Nozzles should be installed with a line spacing of 1 meter.

Dimensions

Caution

Should any parts on the Model AU7 appear to have been compromised, the unit should be returned to the manufacturer

Contact

For further information on FIRE KILL™ products, please contact our sales department at Sales@vidaps.dk

VID Fire Kill ApS
Svalbardvej 13,
DK-5700 Svendborg
Denmark

Phone: +45 62 62 10 24
Fax: +45 62 62 36 61
E-mail: sales@vidaps.dk
Internet: www.vid.eu
Page 1 of 1

Title: Model AU7
No.: DS-171218-05-01 AU7
Rev: 01
Date of first issue: 23-01-2018
Date of revision: 23-01-2018

Test report provides material for the installation manual and you are good to go..

Component tests EN 17450 series

EN 17450

Component test series, example.

First component test, Published Feb. 2021.

Part 1:
Product characteristics and test methods for strainer and filter components

1 Scope

This document specifies product characteristics and test methods for strainer and filter components for water supply connections and pipe work in water mist systems. This document is applicable to strainers and filters with filtration grades up to 6 mm.

5.2.4 Body strength test

This test relates to the requirements specified in 4.5.

The inlet of the test sample shall be connected to a suitable hydraulic pressure supply and the outlet shall be blocked. The sample shall be vented and the pressure shall be increased to three times the design pressure specified by the manufacturer. This pressure shall be maintained for a period of 10 min. At the end of this period the hydraulic pressure shall be released.

A.1 Test facility

The facility carrying out the tests should demonstrate that it operates a quality management system, and that it is technically competent and able to generate technically valid results, according to EN ISO/IEC 17025.

Of particular importance with respect to testing of water mist systems are the following:

a) comprehensive understanding of water mist technology;

b) use of appropriate instrumentation and methodology to verify the compliance or non-compliance with the water mist component requirements.

Test report, part of the EN14972-1:2020.

Test report

Test report, the nozzles performance during full scale fire testing.

What's stated in the test report, according EN14972-1?

A.8Example for fire test report

The documentation of test protocols should contain at least the following:

a) title;

b) a description of the test protocol used, including details of the test apparatus and a reference to the test protocol against which the system was tested, i.e. the relevant part of EN 14972[1];

c) a description of, the condition of, and unambiguous identification of the item(s) tested;

d) the date of receipt of the test item(s) where this is critical to the validity and application of the results, and the date(s) of performance of the test;

e) reference to the sampling plan and procedures used where these are relevant to the validity or application of the results;

f) the test results, with units of measurement where appropriate, including the percentage of any damage to the system components, test rig, or test enclosure, together with the times and parameters recorded during each test;

g) confirmation of water mist system design parameters relevant to the specific application, including, but not limited to, the following:

1) the extinguishing time – if applicable, system operating time and discharge operating time;

2) nozzle designation;

3) permitted location in the protected volume;

4) minimum and maximum installation height limitation;

5) maximum dimensional and area coverage, including spacing between the nozzles;

6) operating flow rates of the nozzle;

7) distance between the ceiling and nozzle orifice;

8) maximum and minimum operating pressure over the operating time of the test;

9) type of detection/actuation method;

10) additives, propellants and atomizing media used;

11) details of the test hall geometry;

12) ventilation conditions during the test;

13) environmental conditions during the test;

h) where relevant, a statement to the effect that the results relate only to the items tested.

Test report

Test report, the nozzles performance during full scale fire testing.

What is described in a test report?

Requirements for FM 5560 Appendix I					
Test description	Damage allowed	Embedded Temperature.	Gas Temperature.	Nozzles allowed operating.	Other nozzle restrictions.
Small Compartment	40%	260°C	315°C	N.A.	Target nozzles may operate
Large Compartment	N.A.	265°C	315°C	Four	No target nozzle may operate.
Under One nozzle	50%	260°C	315°C	Five nozzles.	One nozzle shall remain unactuated beyond each operating nozzle
Between Two nozzles	50%	260°C	315°C	Five nozzles.	One nozzle shall remain unactuated beyond each operating nozzle
Between Four nozzles	50%	260°C	315°C	Five nozzles.	One nozzle shall remain unactuated beyond each operating nozzle

FM 5560 Appendix I					
Test no.	Test description	Water pressure	Water Flow	First nozzle activated	Number of nozzles activated
O-110412-2	Small Compartment	10,0 bar	50 l/min	2min49sec	1 – no target nozzle activated
O-110715-1	Large Compartment	10 bar	50,1 l/min	1min19sec	1 – no target nozzle activated
O-110414-5	Between Four nozzles	10,0 bar	195 l/min	3min33sec	4 - no target nozzle activated
O-110415-6	Between Two nozzles	10,1 bar	104 l/min	3min13sec	2 - no target nozzle activated
O-110415-7	Under One nozzle	10,0 bar	53 l/min	2min16sec	1 - no target nozzle activated

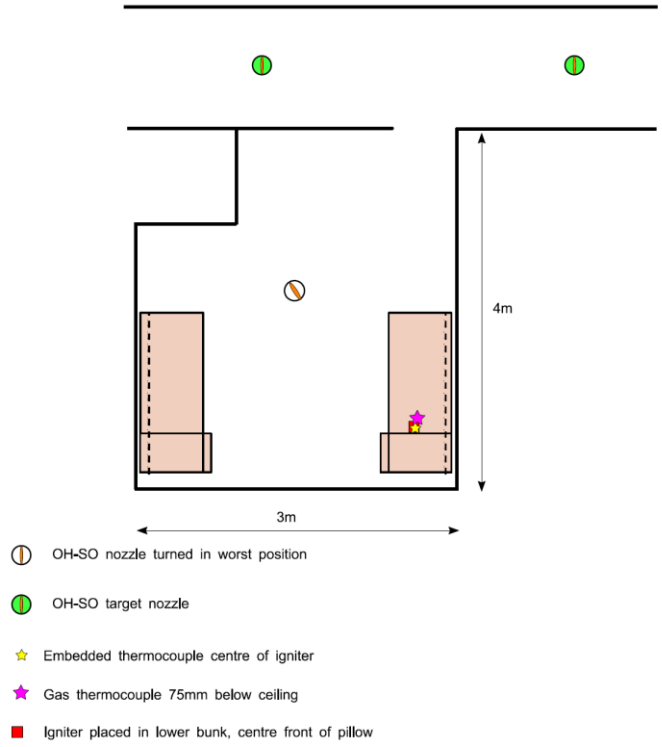
FM 5560 Appendix I					
Test no.	Test description	Damages	Highest gas temp.	Highest embedded temp.	Test passed
O-110412-2	Small Compartment	38,3%	146°C	45°C	YES
O-110715-1	Large Compartment	N.A.	148,5°C	64,2°C	YES
O-110414-5	Between Four nozzles	51,2% *	60°C	51,2°C	YES
O-110415-6	Between Two nozzles	33,3%	135°C	40°C	YES
O-110415-7	Under One nozzle	2%	75°C	35°C	YES **

Test report

Test report, the nozzles performance during full scale fire testing.

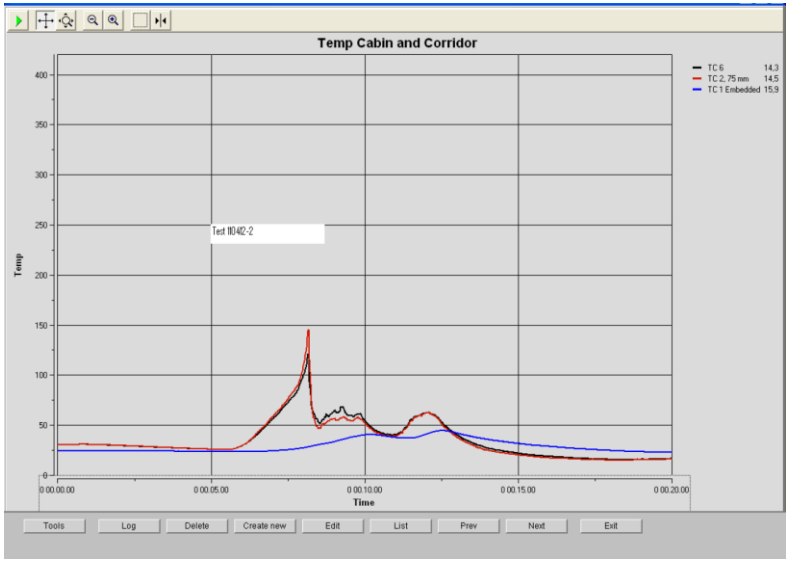
Fire tests.

1. The enclosure was measured and checked accordingly to FM 5560, Appendix I.
2. Thermocouples were placed and checked.
3. Enclosure temperatures were checked.
4. Filling of tray, if any, with oil/heptanes was started or igniter was placed.
5. Data-logging and video were started.
6. Torch was lighted. Test started.
7. When the first nozzle activated, the 10min test time was started.
8. After 10min test time the remaining fire, if any, was manually extinguished.
9. Ventilation of test hall started.
10. Data was saved, video stopped and results evaluated.

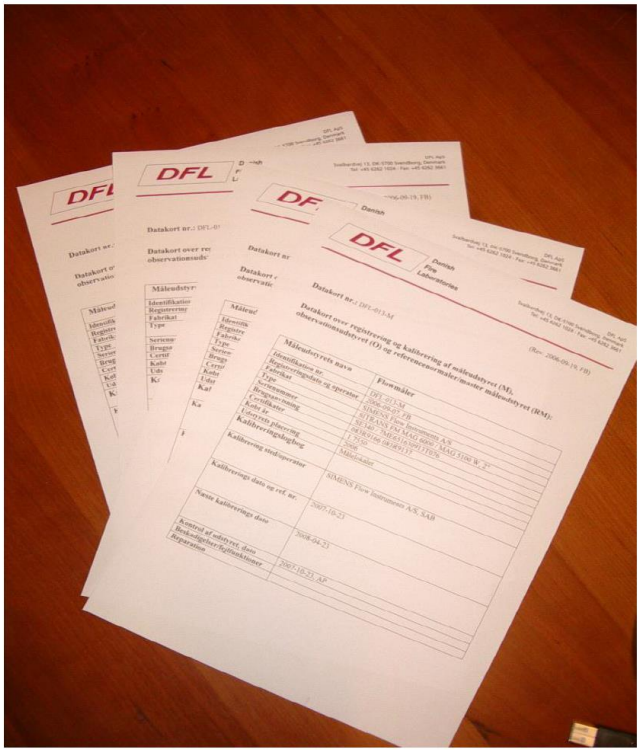


Test report

Test report, the nozzles performance during full scale fire testing.



Documentation DFL´s instruments



DIOM, part of the EN14972-1:2020

DIOM

DIOM, Design, Installation, Operation and Maintenance.

What the manufacturer puts in his DIOM, is basically what his conducted tests shows.

Nozzles	Applications	Risk Areas
OH-OS & OH-VSO	Apartments, atriums, churches, concealed spaces, gymnasiums, hospitals, hotel rooms, institutions, kitchens, libraries, meeting rooms in convention centers and hotels, metalworking shops with non-hydraulic cutting operations, mineral processing (such as: glass, cement, ore treating, gypsum processing, etc.) , museums, nursing or convalescent homes, offices, restaurant seating areas, schools and universities classrooms, unused attics	NFPA, Light Hazard (LH)[ii] FM Datasheet 3-26, HC-1* CEN, Ordinary Hazard (OH1) *

*Exceptions:

Electronic and plastic media storage facilities.

Hospital laboratories with storage and processing of flammable liquids.

Facilities with operations involving hydraulic fluid or flammable liquids

Library stack rooms with structures higher than 2.4 m (8') and aisles no wider than 0.76 m (30")

Nozzle	Standards	Approvals
OH-OS	FM 5560 "HC1" test standard. For **unrestricted** use in most light hazard occupancies described in NFPA 13 and most HC1 areas descried in FM datasheet 3-26.	Factory Mutual Project no. 3041497 + 3050321
OH-VSO	FM 5560 "HC1" test standard. For **unrestricted** use in most light hazard occupancies described in NFPA 13 and most HC1 areas described in FM datasheet 3-26.	Factory Mutual Project no. 3050321 + 3052545 + 3053358

DIOM

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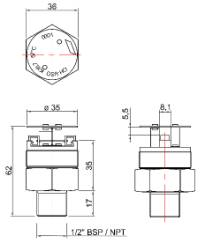


Type:	Pendent
Materials:	Brass & Stainless Steel
Nozzle Body Finish:	NiSn
Water Pressure:	8.0 bar – 16 bar ≈116 psi – 232 psi
K-factor:	16.7 (l/min/√bar) ≈1.16 (gal/min/√psi)
Nominal Flow-rate:	47.23 l/min ≈12.48 gal/min
Maximum Spacing:	4.5 m x 4.5 m (2.25 m to walls) ≈14' 9" x 14' 9" (7' 4" to walls)
Minimum Spacing:	2.25 m x 2.25 m (1.125 m to walls) ≈7' 5" x 7' 5" (3' 2"to walls)
Maximum Ceiling Height:	5.0 m ≈16'5"
Minimum Ceiling Height:	2 m ≈6' 7"
Response Time Index (RTI):	Fast Response < 45 m/√s
Connection/Thread:	½" BSP, ½" NPT
Nominal Release Temperatures:	57°C*, 68°C, 79°C, 93°C, 141°C ≈134°F*, 154°F, 174°F, 199°F, 286°F
Cover Plate:	Chrome, White RAL 9010, Other RAL Colors
For the OH-VSO spray pattern see Annex A.	

*Only FM Approved bulb for OH-VSO.

The system shall be designed in accordance with the VID Fire-Kill minimum system design requirements, shall further comply with the regulations given by the authority having jurisdiction and shall finally comply with the design standards / codes if such are available and applicable. Such codes can be:

- NFPA 750
- CEN/TS 14972
- Local water mist codes, etc.

Note: For FM Approved systems, all designs shall be in accordance with NFPA 750 and FM datasheet 4-2 & 3-26, and all components, other than the OH-OS nozzle, OH-VSO nozzle, and WAC Valve described in the manual, shall be in accordance be FM Approved

The system shall undergo hydraulic pressure-loss calculations calculating the pressure-loss between the most demanding design area of operation and to the water supply and pump unit.

Calculating water flow shall be done using the Hazen-Williams equation. If the pressure system exceeds 12 bar (174 psi) and the velocity exceed 7,6 m/s the Darcy-Weisbach equation shall be used instead of the Hazen-Williams equation.

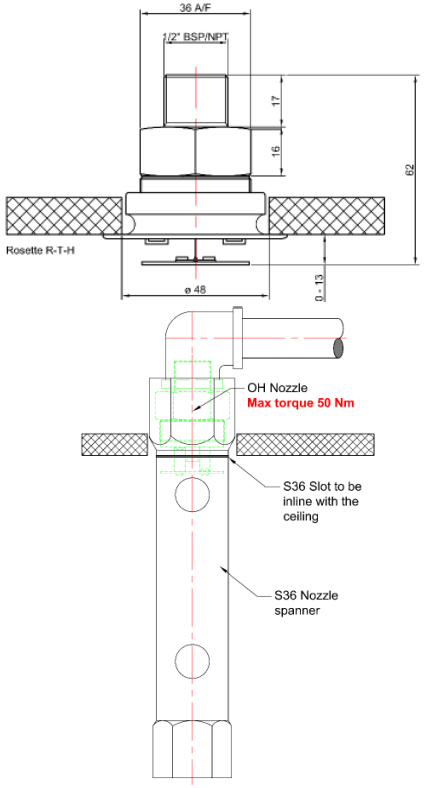
The Hazen-Williams equation is as follows:

$$V = k \circ C \circ R^{0.63} \circ S^{0.54}$$

In which:
V is the velocity of the water,
k is a constant (k=1.318 for US imperial units, k=0.849 for SI units),
R is the radius of the pipes,
S is the rate of pressure loss,
C determines the material used for the piping and components.

DIOM

DIOM, Design, Installation, Operation and Maintenance.



The system shall utilize high capacity strainers with no greater mesh size than 1mm. Strainers should be placed in accessible areas for inspection, maintenance and general cleaning purpose.

The strainer sizes and capacity shall be determined by the water quality, flow and amount that will be needed to sustain the number of nozzles used in the location for, at the least, 60 minutes.

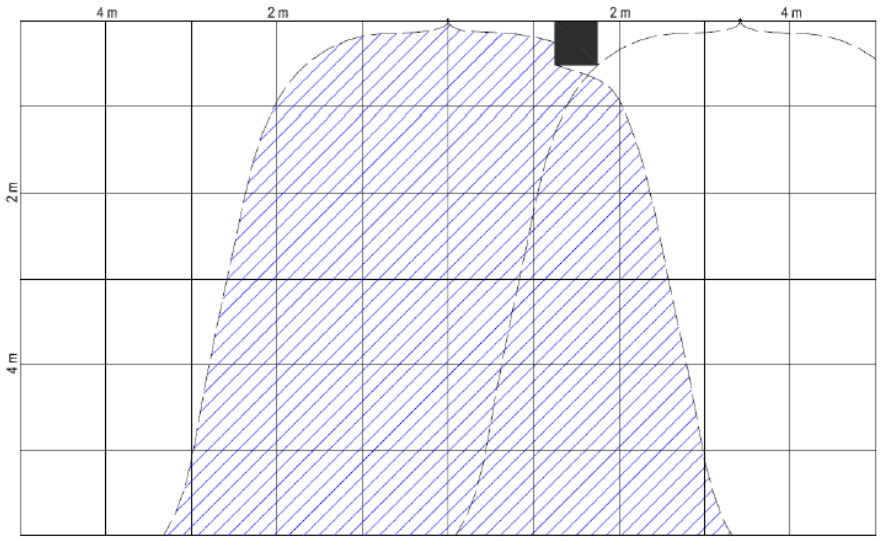
Note: For FM Approved systems, strainer shall be FM Approved.

The fire protection system shall not consist of material combinations with risks of galvanic corrosion to system pipes and other system components. It is required that the system utilize pipes and system components in stainless steel, AISI 304 or AISI 316, PVC plastic pipes or copper alloys as to minimize risk of corrosion and clogging of the pipes and other system components.

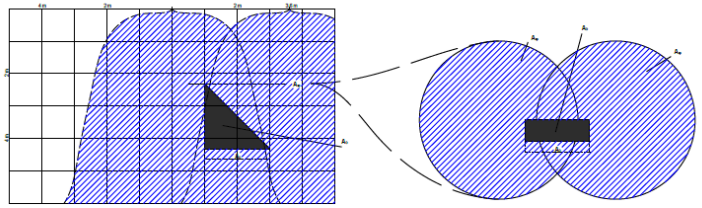
It is prohibited to use components with black iron parts and other such highly corrosive materials else used in traditional sprinkler systems.

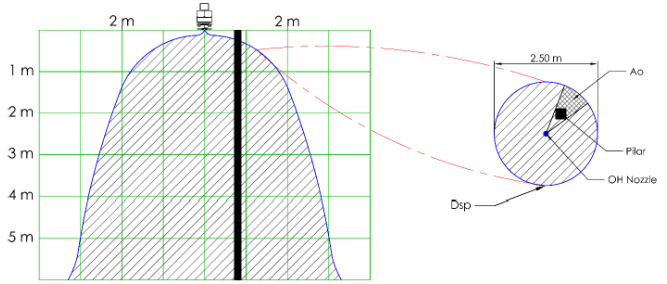
DIOM

DIOM, Design, Installation, Operation and Maintenance.



Obstructions shall be exempted the above mentioned requirements only if the obstructions are situated in the spray pattern of two or more nozzles and that they do not obstruct more than 30% of the spray pattern area at the top of the obstruction (Asp) of each of the involved nozzles.





Dsp is the diameter of the spray 0,5 meter below the ceiling. This is fixed as 2,5 meter for the FIREKILL™ OH Pendent automatic nozzles.

The Ao which is the area of the blind spot shall not be more than 25% of the area for the spray. The area of the 2,5 meter spray is 4,90 m², i.e. the maximum area of Ao is1,22 m².

How to work with EN 14972-1:2020?

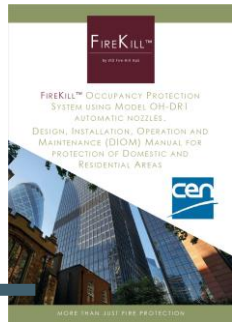
Sufficient system documentation

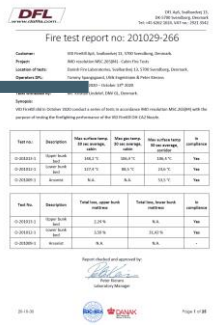
Required documentation accordingly to EN14972

Fire test report(s) showing that the watermist nozzle(s) have successfully passed all the required tests described in a EN14972 part 2-X fire test protocol.

Component test report(s) showing that the watermist system components have successfully passed all the required tests described in EN17450 part 1-X component test protocol (were applicable).

Manufacturers DIOM manual made accordingly to EN14972 and including all system specific details found from the fire and comment tests as well as including other manufacturer- required information.

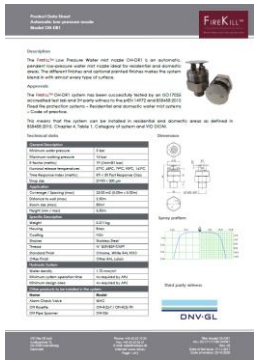




Successful fire testing conducted to a fire test method found in EN 14972 part 2-17

Manufacturer makes DIOM manual accordingly to EN14972 based on results found in fire and component tests including all system specific details.

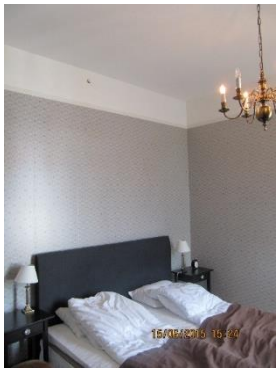
Successful component testing conducted to a component test method found in EN17450 part 1-X



Product + datasheet sent to fire and component test lab.

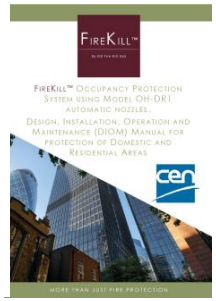
EN14972-1 in a project

Installer/Consultant define the application and applications specific details such as ceiling heights, room sizes, etc.



The Installer/Consultant looks into EN 14972 part 1 and verifies if there is a test method scope that match the application and the application specific details.

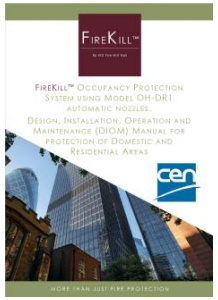
If yes, then the installer can find suppliers that offer the required documentation to the specific test method (EN 14972 part 2-17) and chose the one that suits them best.



All information to work with an appropriate watermist solution can be found in manufacturers DIOM manual + EN 14972 part-1.

Successful watermist project

Local AHJ checks manufacturers documentation (the documents from previous slide)
+ that general requirements from EN 14972 part 1 is fulfilled



Thank you for your attention