



Water Mist Standards – different approaches around the World

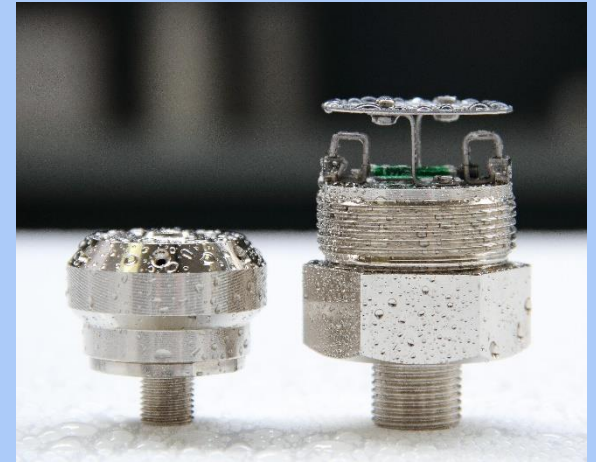
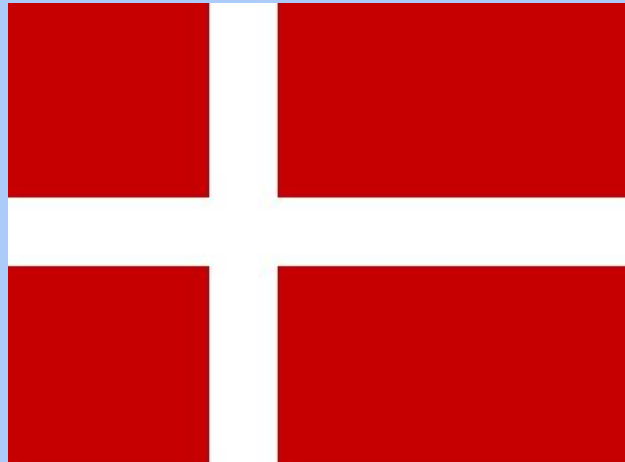
Presenter: Alex Palle
Title: CEO of VID Fire-Kill
Date: Jan 21, 2019
Place: Dubai

Why standards?



FIREKILL™

by VID Fire-Kill ApS





Motivation for my presentation

Watermist often seen as an innovative technology and not getting acceptance on equal terms as conventional solutions. What makes a system a conventional solution – time of cause but also standardization of a technology.

This presentation is to show that the watermist technology is **CONVENTIONAL** along technologies such as sprinklers, gas, foam etc. because robust standards are available for WM.

Different standards used in different parts of the World.

- NFPA standards (USA, Far East, Middle East Europe)
- EN standards (Europe)
- Local standards (e.g. UAE Civil Defense regulations)

This presentation will try to explain the different approaches and what you can expect from each!

Standard Sub categories

WM STANDARDS can be divided into two categories:

Fire test standards (protocols):

- Being used to find limitations for installation (e.g. installation height, vent., obstructions)
- Being used to find system specifics (e.g. K-factor, pressure, spacing)

Overall Design, Installation and Maintenance standards (codes)

- Being used to specify common and overall requirements for all type watermist systems.
- Being used to describe risk classification, system operation area*, system duration time*.

** Sometimes these parameters are found from the testing standards.*

Sometimes in same document
(Notifying Body, FM, VDS)

Examples of available standards



Test standards examples:

- FM5560**: HC1 (NFPA LH), data centers, machinery, turbines, special hazards, more
- UL2167**: NFPA LH, OH1, OH2.
- prEN14972**: NFPA LH, OH1, OH2 applications, machinery, turbines, special hazards, more
- VDS3188** : Car parks, cable tunnels, OH1 (NFPA LH), Offices, more
- DD8458+ 8489**: Domestic & residential areas, OH1 (NFPA LH), more.
- IMO**: All applications found on ships.

Design standard examples:

- USA: **NFPA 750**
- Europe: **prEN14972**
- Marine: **SOLAS**
- FM/VDS insured buildings: **FM5560 / VDS 3188**

Difference between NFPA750 and prEN14972



	NFPA 750	prEN 14972
Components (pumps)	NFPA 20	Low: EN12845 & EN12259-12 (centrifugal pumps) High: EN 14847 (positive displacement pumps)
Components (tanks, Valves, hangers, pipes, nozzles, strainers, pump controllers)	Listed + minor requirements mentioned in NFPA 750 + Reference to ASTM standards	Minor requirements mentioned in prEN 14972 part 1 + Compliance to EN standards for sprinkler and gas components. <i>In the future unique EN standards will be developed for WM components and “parked” under prEN 14972.</i>
Component Materials	Copper, Stainless steel or other listed materials with same corrosion resistance	Stainless steel or equivalent (copper, zinc coated steel and synthetic materials may be used if found not to create clogging and suited for the purpose).
Fire test accepted	External test protocols	Internal test protocols
Design (Classification, water supply)	Occupancy (minimum 30min). Specific (accordingly to listing, always ext. time x2). Design area accordingly to listing.	Application Specific . Defined in prEN 14972 part 1
Other design and Installation requirements	DIOM	DIOM
Maintenance requirements	NFPA 25 & DIOM	EN 12845 / EN15004-1 where relevant + DIOM
Final Acceptance	AHI	AHI

Difference between NFPA750 and FM5560



	NFPA 750	FM5560 (Notifying Body)
Components (pumps)	NFPA 20	FM approved. FM loss prevention datasheets, NFPA 20 and NFPA 750
Components (tanks, Valves, hangers, pipes, nozzles, strainers, pump controllers)	Listed + minor requirements mentioned in NFPA 750 + Reference to ASTM standards	FM Approved FM loss prevention datasheets, NFPA 20 and NFPA 750.
Component Materials	Copper, Stainless steel or other listed materials with same corrosion resistance	Copper or Stainless steel only.
Fire test accepted	External test protocols	FM test protocols
Design (Classification, water supply)	Occupancy (minimum 30min). Specific (accordingly to listing, always ext. time x2). Design area accordingly to listing.	Occupancy: (FM DataSheet 3-26) Pre-eng.: 10min or ext. time x2, whatever is greater.
Other design and Installation requirements	DIOM	DIOM
Maintenance requirements	NFPA 25 & DIOM	FM Inspection+ DIOM
Final Acceptance	AHJ	FM Inspection (APPROVAL)

The difference between “Compliance” and “Listing/Approval”

prEN14972 (2019) - “Compliance”

Acceptance: Successful testing to a test protocol in the prEN14972 series (part 2-17 currently).



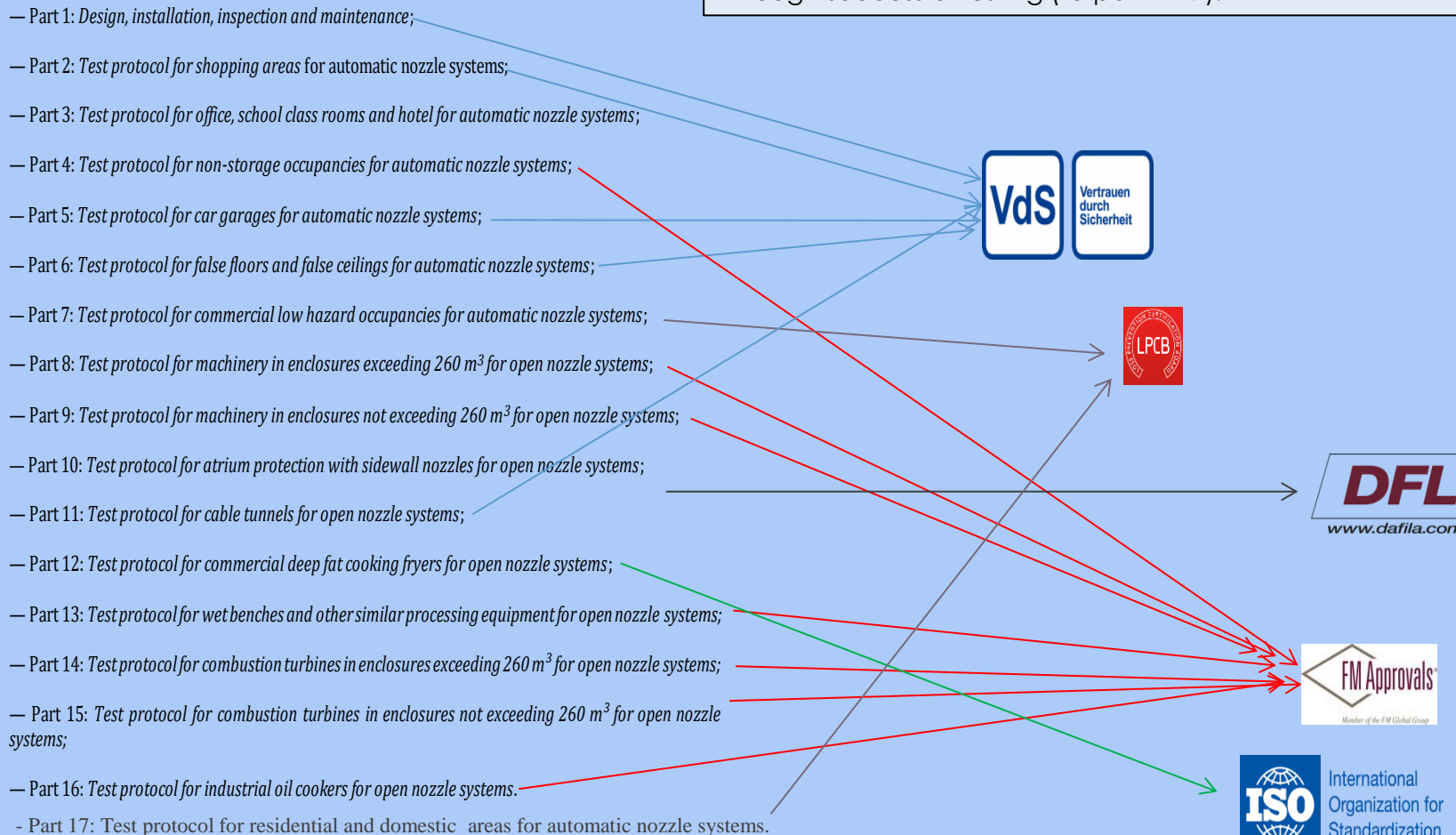
The Format of prEN 14972



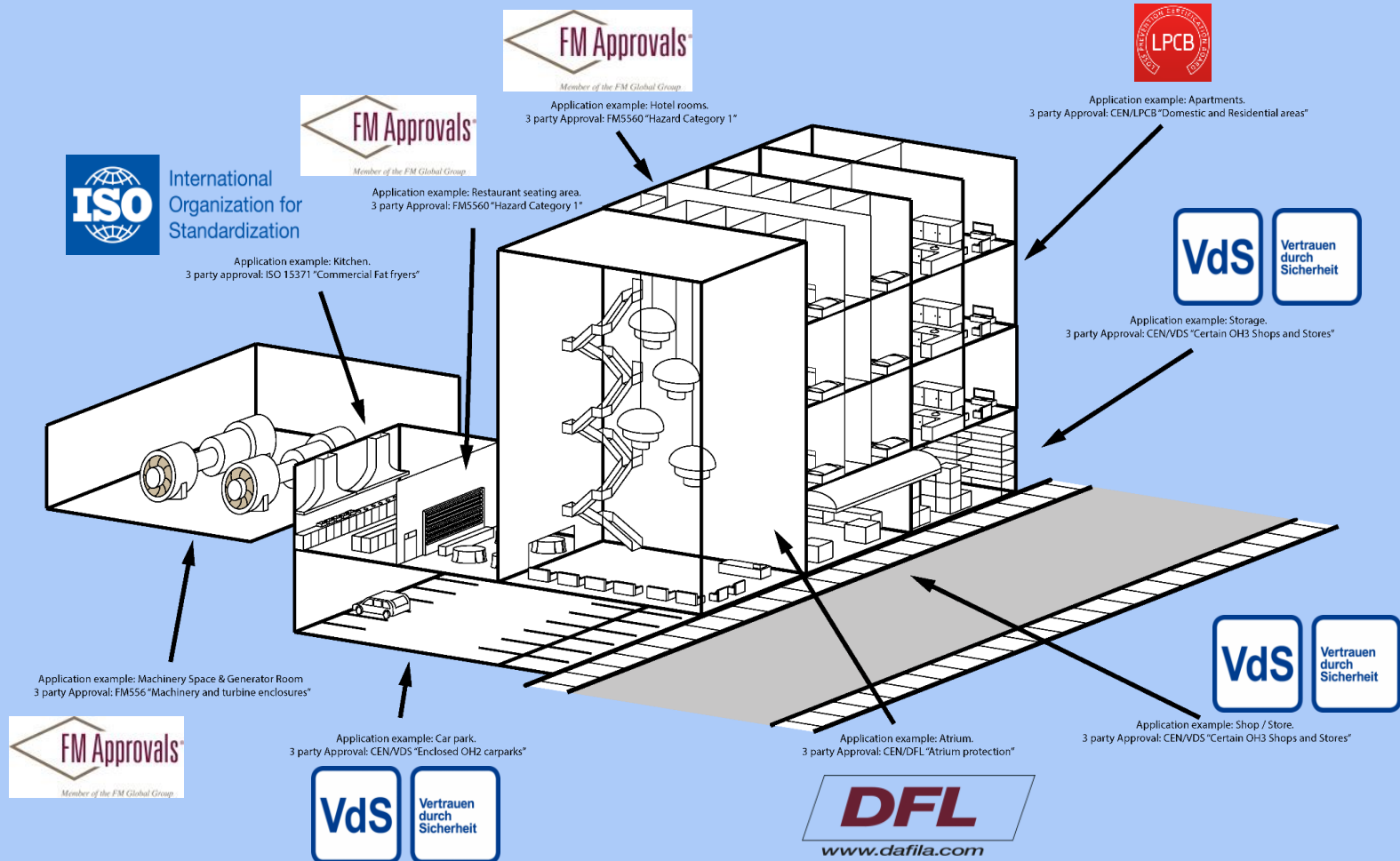
Design document ensuring same WM quality level as sprinklers. Main difference is compliance of a system is done through successful testing (to part 2-17).

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 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 and domestic areas for automatic nozzle systems*.



A typical Building



Compliance example



**OK documentation:
Certificate**

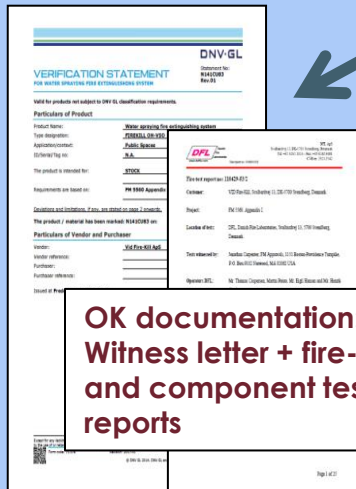
3. party to witness fire tests / approve test reports, and approve DIOM manual.



Successful fire and component testing conducted in an ISO 17025 accredited test lab to a test protocol found in CEN/EN 14972 part 2-X

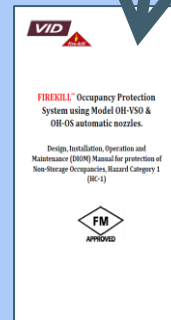


Product + datasheet sent to fire and component test lab.



**OK documentation:
Witness letter + fire-
and component test
reports**

Manufacturer makes DIOM manual based on results found in tests including all system specific details.





NFPA 750 (2019) – “Listing/Approval”

Acceptance: Fire test protocols where a listing can be obtained. The protocol shall be fit to the application and be accepted by the AHJ.

Recognized in NFPA750:

IMO 1165, IMO1387 and IMO A800 + MSC 265

FM5560, UL2167, CEN/TS 14972, etc.



“Listing” definition from chapter 3.2.3

- *Equipment, materials, or services included in a list **published by an organization** that is **acceptable** to the **authority having jurisdiction** and concerned with evaluation of products or services, that maintains **periodic inspection** of production of listed equipment or materials or periodic **evaluation** of services, and whose listing states that either the equipment, material, or service **meets appropriate designated standards or has been tested and found suitable for a specified purpose.***

Listing (FM) example

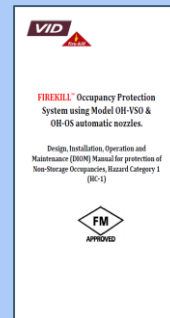


Product + datasheet sent to FM approved fire and component test lab.

Successful fire and component testing conducted by FM or/and witnessed by FM to the FM5560 code.

FM approves the test reports and the DIOM manual.

Manufacturer makes DIOM manual based on results found in tests including all system specific details.



Listing (FM) example

NOTE: When the listed system is used accordingly to NFPA750 the local AHJ can deviate from the FM rules but the system still has to be listed!



Certificate of Compliance

This certificate is issued for the following:

Water Mist System

System Designation:	FIREKILL™ Total Flooding System Using Model K6 Open Nozzles for the protection of machinery in enclosures with volumes up to, and including, 162,800 ft ³ (4610 m ³) at a maximum height of 39.4 ft (12.0 m)
Design, Installation, Operation and Maintenance Manual:	FIREKILL™ Total Flooding System Using Model K6 Open Nozzles Design, Installation and Maintenance (DIOM) Manual for protection of machinery and combustion turbines in enclosures, Doc No 110629-02-004, dated 10-10-2007

Prepared for:
VID FIRE-KILL APS
SVALBARDVEJ 13
SVENDBORG
DK-5700
DENMARK

Manufactured at:
VID FIRE-KILL APS
SVALBARDVEJ 13
SVENDBORG
DK-5700
DENMARK

FM Approvals Class: 5560

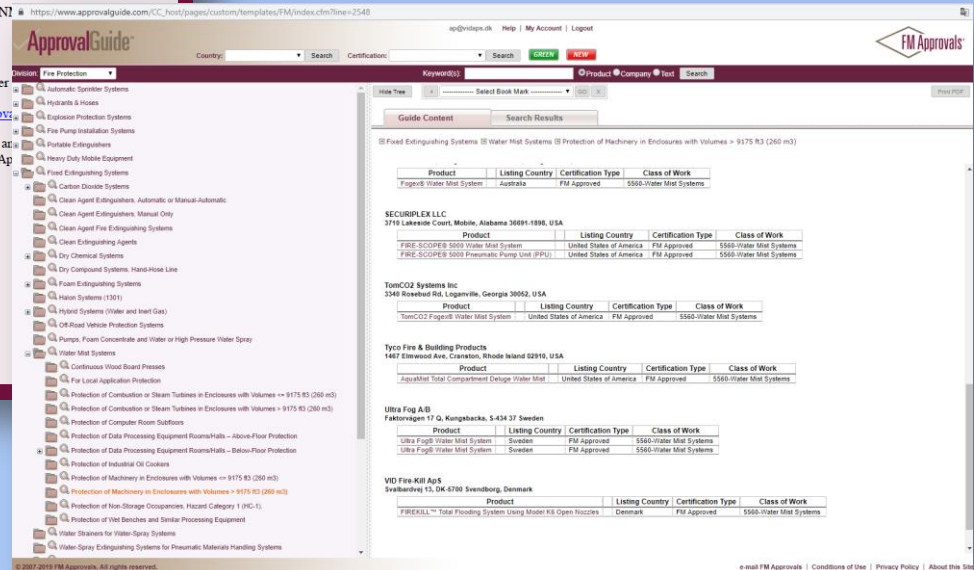
Approval Identification: 3061155 Approval Granted: December

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and constructions as shown in the Approval Guide, an online resource of FM Approvals



David B. Fuller
VP, Manager – Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA

The screenshot shows the ApprovalGuide website interface. The search results for 'Water Mist System' are displayed, listing several approved products with their respective details:

Product	Listing Country	Certification Type	Class of Work
Fogex® Water Mist System	Australia	FM Approved	5560-Water Mist Systems
SECURIPLEX LLC			
3718 Lakeside Court, Mobile, Alabama 36691-1896, USA			
Product	Listing Country	Certification Type	Class of Work
FIRE-SCOPE® 5000 Water Mist System	United States of America	FM Approved	5560-Water Mist Systems
FIRE-SCOPE® 5000 Pneumatic Pump Unit (IPU)	United States of America	FM Approved	5560-Water Mist Systems
TomCO2 Systems Inc			
3340 Rosewood St., Loganville, Georgia 30052, USA			
Product	Listing Country	Certification Type	Class of Work
TomCO2 Fogex® Water Mist System	United States of America	FM Approved	5560-Water Mist Systems
Tyco Fire & Building Products			
1487 Elmwood Ave., Cranston, Rhode Island 02910, USA			
Product	Listing Country	Certification Type	Class of Work
AquaMist Total Compartment Deluge Water Mist	United States of America	FM Approved	5560-Water Mist Systems
Ultra Fog A/B			
Faktorligen 17 G, Kungälv, S-434 37 Sweden			
Product	Listing Country	Certification Type	Class of Work
Ultra Fog® Water Mist System	Sweden	FM Approved	5560-Water Mist Systems
Ultra Fog® Water Mist System	Sweden	FM Approved	5560-Water Mist Systems
VID Fire-Kill ApS			
Svalbardvej 13, DK-5700 Svendborg, Denmark			
Product	Listing Country	Certification Type	Class of Work
FIREKILL™ Total Flooding System Using Model K6 Open Nozzles	Denmark	FM Approved	5560-Water Mist Systems

In short...



When following prEN14972 watermist systems has to be designed in accordance with the standard but they do not need to be approved by a third party. All parts of the system however has to comply to EN standards. The AHJ has to have knowledge about EN standards and in general there has to be a certain trust-level between stakeholders.

When following NFPA750 watermist systems has to be designed in accordance with the standard and all components has to be listed but the project specific AHJ decides if the listings are appropriate for the project.

If following a notifying body standard fully (FM5560) then a watermist system and the design of that has to be approved by the notifying body - And the project specific AHJ is the notifying body.

... what about local watermist standards..



When following a local WM standard you can expect it to require the watermist system to be “listed” as it is an “easy” way to ensure that the system has a certain quality level but the rules for system design and how the listed components are combined is very specific set, designed to cover certain aspects of local regulations or/and specific challenges only met locally.

More or less local WM standards follow the methodology of NFPA750 but the difference is that there is an AHJ layer on top of the project specific AHJ.

Example UAE



Certificate of Compliance

This certificate is issued for the following:

Water Mist System

System Designation:	FIREKILL™ Total Flooding System Using Model K6 Open Nozzles for the protection of machinery in enclosures with volumes up to, and including, 162.800 ft ³ (4610 m ³) at a maximum height of 39.4 ft (12.0 m)
Design, Installation, Operation and Maintenance Manual:	FIREKILL™ Total Flooding System Using Model K6 Open Nozzles Design, Installation and Maintenance (DIOM) Manual for protection of machinery and combustion turbines in enclosures, Doc No 110629-02-004, dated 10-10-2007

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VID FIRE
SVALBA
SVEN
DK
DEN

Approv
To verify
Said Approval is subject
constn

David B. J
VP, Mana
FM Appro
1151 Bost
Norwood



United Arab Emirates
Ministry of Interior
Civil Defense G.H.O.
Fire Intentional Lab & House
Of Expertise & Training Center
Approval Committee



دولة الامارات العربية المتحدة
وزارة الداخلية
القيادة العامة للدفاع المدني
لجنة اعتماد المختبرات العالمية
وبيوت الخبرة ومعاهد التدريب

Laboratory and Certification body details			
NAME OF CERTIFICATION BODY	FM Approvals	NAME OF TEST FACILITY	FM Approvals
CERTIFICATION BODY ADDRESS / REGION (STREET / TOWN / CITY / COUNTRY)	1151 Boston-Providence Turnpike Norwood, MA 02062 USA	TEST FACILITY ADDRESS / REGION (STREET / TOWN / CITY / COUNTRY)	1151 Boston-Providence Turnpike Norwood, MA 02062 USA
WEBSITE	www.fmapprovals.com	WEBSITE	www.fmapprovals.com
TEL	+1 (1) 781 762 4300	TEL	
EMAIL	information@fmapprovals.com	EMAIL	

FM APPROVALS IS ACCREDITED BY	PER	VALIDITY
The Standards Council of Canada (SCC) www.scc.ca	ISO/IEC 17065	28 April 2023
The Standards Council of Canada (SCC) www.scc.ca	ISO/IEC 17025 ISO/IEC 17025	01 December 14 December
International Accreditation Service (IAS) www.iasonline.org	ISO/IEC 17025	09 February
Occupational Safety and Health Administration (OSHA) www.osha-slc.gov	Guide 25/65	14 July 2019
United Kingdom Accreditation Service (UKAS) www.ukas.com	ISO/IEC 17065	01 February
IECEx Conformity Assessment System www.iecex.com	ISO/IEC 17065	31 October 2



(ENDORSEMENT) TO BE SIGNED BY MANUFACTURER

NAME OF MANUFACTURER'S SIGNATORY	Henrik Abrahamsen	SIGNATURE
EMAIL / TEL	nh@vidaps.dk	FACTORY OFFICE SEAL

NOTES: Undertake that all data and information provided are genuine and

وبيوت الخبرة ومعاهد التدريب

إدارة السلامة الوقائية - تمسر اعتماد الشركات



دولة الامارات العربية المتحدة
وزارة الداخلية
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Emergency
997
www.dcd.gov.ae

رقم الترخيص:	K29
سنة الترخيص:	2014
عدد التراخيص:	(4-2)

اسم المعدة	الاسم التجاري	بلد الصنع	قيد الوكالة	منطقة النشاط	تاريخ الانتهاء قيد الوكالة
نظام رذاذ الماء تلقائي Automatic Water Mist System					
Water Spray System: Model: K6 Usage: Protection of Machinery and Combustion or Steam Turbines in Enclosures up to 4610 m ³ and 12 m in Height Min. Water Pressure: 111.7 psi Discharge Type: Single Fluid, Continues Discharge					
	Fire Kill	الدنمارك	15944	دبي	2014/07/23



جهة الإدارة العامة للدفاع المدني/ دبي

Final words

Watermist is “conventional”
as standardization level is as high
as any other fire protection solution!



Thank you for your attention