VERIFICATION STATEMENT

FOR WATER SPRAYING FIRE EXTINGUISHING SYSTEM

Statement No:
N141D1RJ
Rev.02

Valid for products not subject to DNV GL classification requirements.

Particulars of Product

Product Name:	**Water spraying fire extinguishing system**
Type designation:	**FIRE-KILL OH-PX2**
Application/context:	**OH-3 Sales, Storage and technology areas.**
ID/Serial/Tag no:	**N.A.**
The product is intended for:	**STOCK**
Requirements are based on:	**CEN/EN 14972 part 2 and VDS test method: Selected OH-3 sales, storage and technology areas enclosed by OH-1 areas. c ☐**

Deviations and limitations, if any, are stated on page 2 onwards.

The product / material has been marked: N141D1RJ on:

Particulars of Vendor and Purchaser

Vendor:	**Vid Fire-Kill ApS**
Vendor reference:	
Purchaser:	
Purchaser reference:	

Issued at **Fredericia FiS** on **2020-01-17**

for **DNV GL**

This document has been digitally signed and will therefore not have handwritten signatures

Lindelof, Kristian
Surveyor

Verification extent and result

Verification extent:
Fire-fighting performance test according to CEN/EN 14972, part 2 and VDS test method: Selected OH-3 sales, storage and technology areas.

Verification result/comments:
The VID Fire-Kill low pressure water mist system with VID Fire-Kill OH-PX2 nozzle, installed with 3,5 x 3,5 metres spacing and 6 / 7 bar water pressure, has been successfully tested to the international approval test CEN / EN 14972 part 2.

Report

The undersigned witnessed successfully testing at Danish Fire Laboratories (DFL), test facility accredited according to ISO 17025, on 2017-02-16 and 2017-02 28.
Reference is made to DFL test report no. DFL-160812-181A.1 and Fire-Kill OH-PX2 DIOM manual, DOC no. 170420-01-01 dated 2017 04-20.

Fire test report no: 160812-181A.1

Customer:	VID Fire Kill ApS, Denmark.
Project:	CEN / VDS OH3
Test Protocol:	VDS test method “selected OH-3 sales, storage and technology areas enclosed by OH-1 areas” + CEN/TS14972 annex B
Location of tests:	DFL - Danish Fire Laboratories, Denmark
Operators DFL:	Anders Tychosen, Brian Pedersen & Morten Henriksen.
Test period	January 2017 – March 2017

Synopsis:

VID Fire-Kill did in January to March 2017 conduct a series of fire extinguishing tests at DFL (Danish Fire Laboratories) in Svendborg, Denmark.

The purpose of the tests was to test the firefighting performance of the VID Fire-Kill Model OH-OPX2 nozzle with K-value 19 (metric) to the test method VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas + CEN/TS14972 appendix B, which covers respectively “Block Storage ST1 areas” and “Rack Storage ST5/6 areas”.

The Model OH-PX2 nozzles where installed with 3.5m spacing and used a water pressure of 6 bar for Block Storage tests ST1 and 7 bar for Rack Storage tests ST5/6.

The Model OH-PX2 nozzles where installed at 4m ceiling height.

All the tests were conducted in accordance with VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas + CEN/TS14972 appendix B, and the results were found successful.

Main results

Description *(Note: The more unfavorable tests have been conducted but only the needed tests are reported in this table)*	Block storage ST1			
	Below 1 nozzle	Below 1 nozzle	Between 4 nozzles	Between 4 nozzles
	Sprinkler reference	Watermist	Sprinkler reference	Watermist
DFL Test no.	Test O-170126	Test O-170216	Test O-170203	Test O-170227
Installed number of nozzles / sprinklers	5	5	4	4
Number of activated nozzles / sprinklers	3	5	4	3
Operation time of first nozzle from ignition	45 sec	27 sec	1 min 07 sec	39 sec
Water pressure	1.5 bar	6 bar	1.5 bar	6 bar
Nominal water flow	294 l/min	232.5 l/min	392 l/min	139.5 l/min
Ceiling height	4m	4m	4m	4m
Nozzle / sprinkler spacing	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m
Density	8 mm/min	3.8 mm/min	8 mm/min	3.8 mm/min
Gas Temperature measurements				
Peak 1 temperature	367.93°C (TC2)	227.90°C (TC2)	186.13°C (TC1)	93.51°C (TC1)
Peak 2 temperature	501,56°C (TC3)	231.22°C (TC3)	205.93°C (TC3)	91.23°C (TC3)
Peak 3 temperature	349.65°C (TC4)	213.31°C (TC4)	230.26°C (TC4)	96.25°C (TC4)
Peak (1-3) average	406,38°C	224.14°C	207.44°C	93.66°C
Fuel damage in procent	73%	63%	70%	60%
TEST PASSED	NA	Yes	NA	Yes

Description *(Note: The more unfavorable tests have been conducted but only the needed tests are reported in this table)*	Rack storage ST5/6			
	Below 1 nozzle	Below 1 nozzle	Between 4 nozzles	Between 4 nozzles
	Sprinkler reference	Watermist	Sprinkler reference	Watermist
DFL Test no.	Test O-170208	Test O-170306	Test O-170314	Test O-170302
Installed number of nozzles / sprinklers	5	5	4	4
Number of activated nozzles / sprinklers	4	5	4	4
Operation time of first nozzle from ignition	2 min 13 sec	1 min 18 sec	2 min 26 sec	2 min 51 sec
Water pressure	1.5 bar	7 bar	1.5 bar	7 bar
Nominal water flow	392 l/min	232.5 l/min	392 l/min	186 l/min
Ceiling height	4m	4m	4m	4m
Nozzle / sprinkler spacing	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m
Density	8 mm/min	4.1 mm/min	8 mm/min	4.1 mm/min
Gas Temperature measurements				
Peak 1 temperature	245.74°C (TC4)	325.17°C (TC4)	293.79°C (TC4)	329.03°C (TC4)
Peak 2 temperature	392.36°C (TC5)	286.38°C (TC5)	596.17°C (TC5)	183.40°C (TC5)
Peak 3 temperature	NA	NA	NA	NA
Peak (1-3) average	319.05°C (TC2)	305.78°C	444.98°C	256.22°C
Fuel damage in procent	76%	64%	73%	62%
TEST PASSED	NA	Yes	NA	Yes

Report checked and approved by:

October 31, 2019

Ove Andersen
Laboratory Manager

1 SCOPE

1.1 Scope and design.

VID Fire-Kill did in January to March 2017 conduct a series of fire extinguishing tests at DFL (Danish Fire Laboratories) in Svendborg, Denmark.

The purpose of the tests was to test the firefighting performance of the VID Fire-Kill Model OH-OPX2 nozzle with K-value 19 (metric) to the test method VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas + CEN/TS14972 appendix B, which covers respectively “Block Storage ST1 areas” and “Rack Storage ST5/6 areas”.

2 TEST SET-UP

2.1 Test Hall

All tests were conducted inside DFLs main test hall which is insulated and heated. The test hall volume has a floor area of 20m x 20m and a height of 15m ensuring plenty of oxygen for the fire tests. The test laboratory has water storage tanks and continuous fresh water supply, pump station with controlled water pressure supply and installations for handling of smoke and waste water.

2.1.1 Test ceiling

All the fire tests were conducted with the ceiling height at 4m with a suspended ceiling having an area size of 225m^2 (15m x 15m). There was 2.5m distance between the suspended ceilings to all test hall walls.

2.2 The test set-up

All the fire tests were conducted accordingly to VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas and CEN/TS14972 appendix B.

2.2.1 Fuels and ignition source

2.2.1.1 Card board boxes

The cardboard boxes used meet the following requirements:

- Cardboard box:
- Material: simple corrugated cardboard
- Dimensions:
- Small boxes: 600 mm x 400 mm x 300 mm (LxWxH)
- Large boxes: 600 mm x 400 mm x 500 mm (LxWxH)
- Total weight incl. cups:
- Small boxes: ~3,5 kg
- Large boxes: ~4,5 kg
- Underliners (corrugated cardboard) divided into five levels
- 18 cups per level, cups secured against shifting by dividers and underliners made of corrugated cardboard
- Boxes are sealed with adhesive tape and marked in the direction of the stacks
- Plastic cups:
- Type: European Standard Cups

- Material: unexpanded polystyrene (PS), transparent
- Unit weight: 28,2 g
- Number per box:
- Large boxes: 90 items, total weight of cups ~2,5 kg
- Small boxes: 54 items, total weight of cups ~1,5 kg

2.2.1.2 Fuels for Block Storage tests ST1

The test scenario simulates classic block storage including the appropriate fire loads.

The test assembly included the following elements:

- Cardboard boxes (600 mm x 400 mm x 500 mm) with plastic cups
- Standard Euro pallets (wood) as seat area for boxes to be stacked

2.2.1.2.1 Box with plastic cups

2.2.1.3 Fuels for Rack Storage tests ST5/6.

The test scenario simulates classic rack storage including the appropriate fire loads.

All tests are carried out with identical test assemblies which meet the requirements specified in this clause.

The test assembly included the following elements:

- Cardboard boxes with plastic cups
- Racks

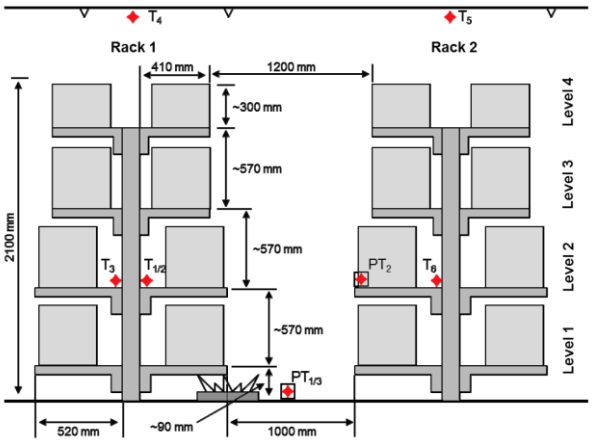
2.2.1.3.1 Box with plastic cups

2.2.1.4 Fire load and ignition source rack storage

Initial fire is a fire pan positioned centrally underneath Rack 1 or centrally between the two storage blocks respectively.

The fire pan shall meet the following requirements:

- Material: steel
- Dimensions: 200 mm x 200 mm x 20 mm
- Quantity n-heptane: 120 ml
- Position: underneath Rack 1

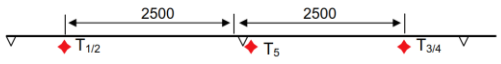


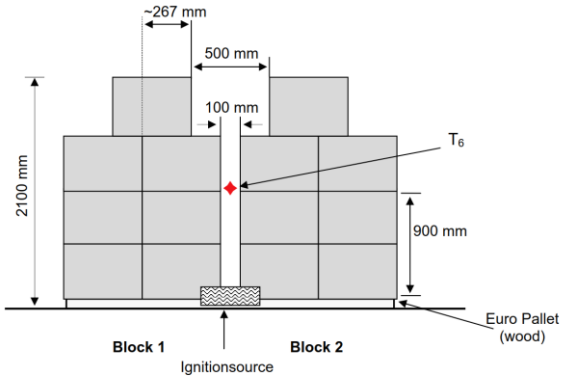
2.2.1.5 Fire load and ignition source block storage

Initial fire is a fire pan positioned centrally underneath Rack 1 or centrally between the two storage blocks respectively.

The fire pan shall meet the following requirements:

- Material: steel
- Dimensions: 200 mm x 200 mm x 20 mm
- Quantity n-heptane: 120 ml
- Position: centrally between the two storage blocks





2.2.2 Test mock-up

2.2.2.1 Test mock-up for Block Storage tests ST1

2.2.2.2 Test mock-up for Rack Storage tests ST5/6.

2.2.3 Instrumentation

2.2.3.1 Instrumentation for Rack Storage tests ST5/6

Temperature measurement – Rack storage ST5/6

The values for the tests Rack storage ST5/6 are measured by:

- Thermocouples

TC1 [°C] – Rack 1, Level 2 between last and second to last box in box row averted from the ignition source

TC2 [°C] – Rack 1, Level 2, analogous to T1 on opposite side of rack

TC3 [°C] – Rack 1, Level 2, centrally in box row averted from the ignition source

TC4 [°C] – centrally above Rack 1

TC5 [°C] – centrally above Rack 2

TC5 [°C] – Rack 2, Level 2, centrally in box row facing the ignition source

For measuring the temperature, exposed 0.5 mm thermocouples of type K shall be positioned 75 mm below the ceiling surface.

- Plate thermocouples

PT1 [°C] – centrally between Rack 1 and Rack 2 positioned on the floor

PT2 [°C] – centrally between Rack 1 and Rack 2 positioned on the floor

PT3 [°C] – Rack 2, Level 2, centrally in box row facing the ignition source

DFL did also in all tests measure flowrate and pressure.

2.2.3.2 Instrumentation for Block Storage tests ST1.

The values for the tests Block storage ST1 are measured by:

- Thermocouples

TC1 [°C] – at the ceiling above outer edge of Block 1

TC2 [°C] – at the ceiling above outer edge of Block 1

TC3 [°C] – at the ceiling above outer edge of Block 2

TC4 [°C] – at the ceiling above outer edge of Block 2

TC5 [°C] – at the ceiling above ignition source

TC6 [°C] – centrally between Block 1 and Block 2, 900 mm above ignition source

For measuring the temperature, exposed 0.5 mm thermocouples of type K shall be positioned 75 mm below the ceiling surface.

- Plate thermocouples

PT1 [°C] – centrally between Block 1 and Block 2 positioned on the floor

PT2 [°C] – centrally between Block 1 and Block 2 positioned on the floor

PT3 [°C] – outside Block 2 (side averted from ignition source), centrally

PT4 [°C] – outside Block 2 (side averted from ignition source), centrally

DFL did also in all tests measure flowrate and pressure.

3 FIRE FIGHTING SYSTEM

3.1 Water supply system.

Fresh and clean water was supplied to the firefighting system from DFL´s pressure controlled fire pump system at a constant pre-set pressure utilization a pressure transmitter in the pipe system.

3.2 Water mist nozzles.

The nozzles used were the VID Fire-Kill Model OH-PX2.

The nozzle pressure applied was 6 bar for Block Storage tests ST1 and 7 bar for Rack Storage tests ST5/6.

The nominal nozzle k-factor was after the test measured to be 19.0 ±5% (liters/min./√bar) which was found by measuring the water-flow at a pre-set pressure. The k-factor equation (Q=K x √P) was used to calculate the k-factor. See nozzle datasheet in appendix C.

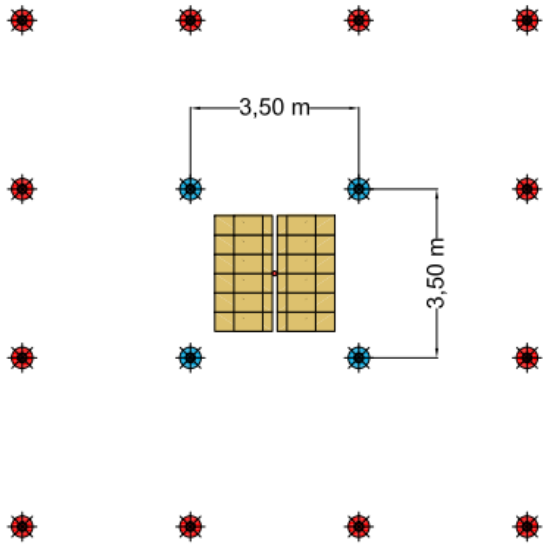
3.2.1 Watermist nozzle installation.

3.2.1.1 Ledgend

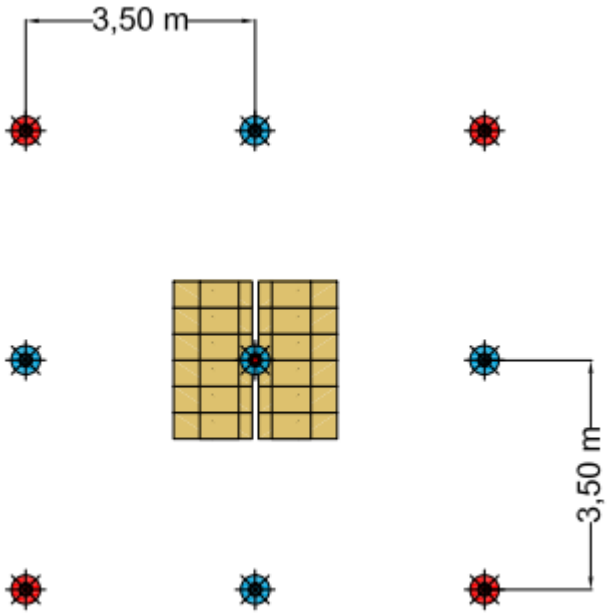
	RACK Fuel package
	BOX Fuel package
	FIREKILL Nozzle, dry target nozzle
	FIREKILL OH-PX1 Nozzle with water

Ledgend

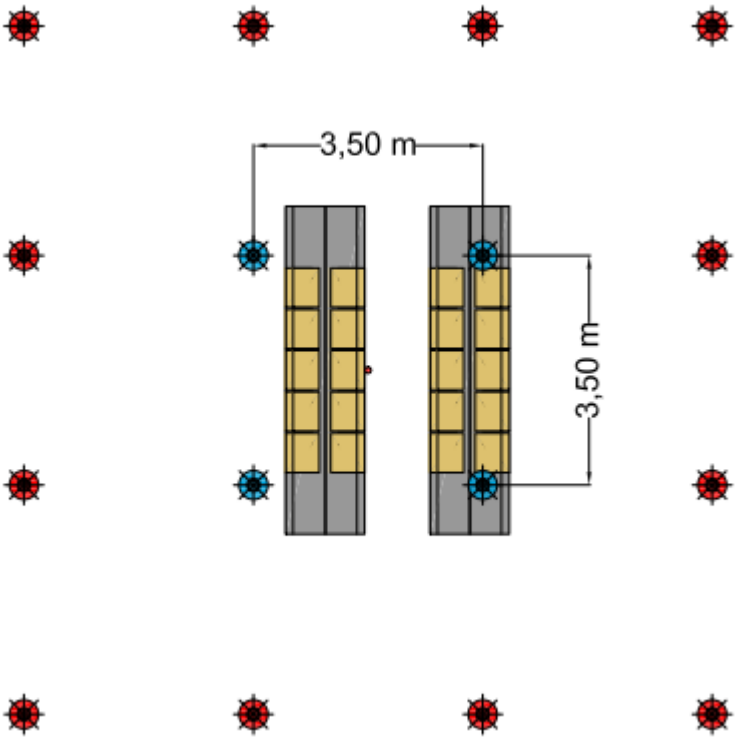
3.2.1.2 Between 4, block storage



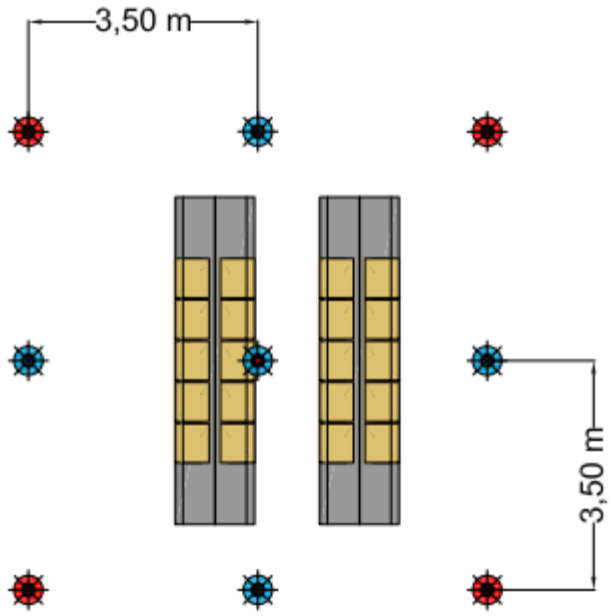
3.2.1.3 Under 1, block storage



3.2.1.4 Between 4, rack storage



3.2.1.5 Under 1, rack storage



3.3 Reference sprinklers.

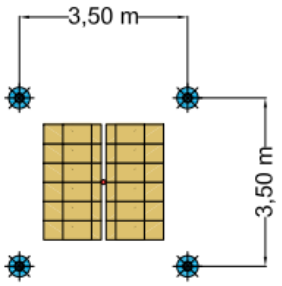
The reference sprinkler used were the “15mm GW-S SSP STD (SH005 1002 B)”

The sprinkler pressure applied was 1.5 bar for both the Block Storage tests ST1 and the Rack Storage tests ST5/6.

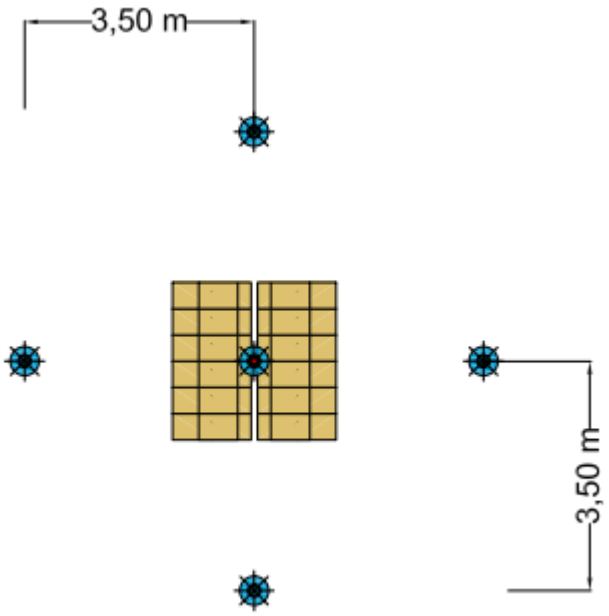
The nominal sprinkler k-factor was after the test measured to be 80.0 ±5% (liters/min./√bar) which was found by measuring the water-flow at a pre-set pressure. The k-factor equation (Q=K x √P) was used to calculate the k-factor. See sprinkler datasheet in appendix D.

3.3.1 Sprinkler installation.

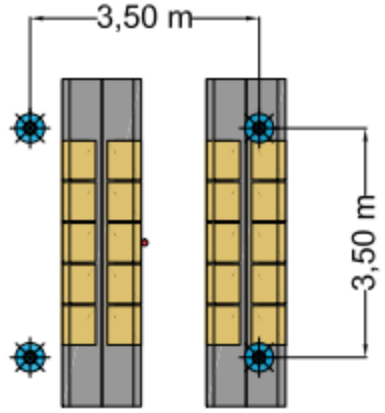
3.3.1.1 Between 4, block storage



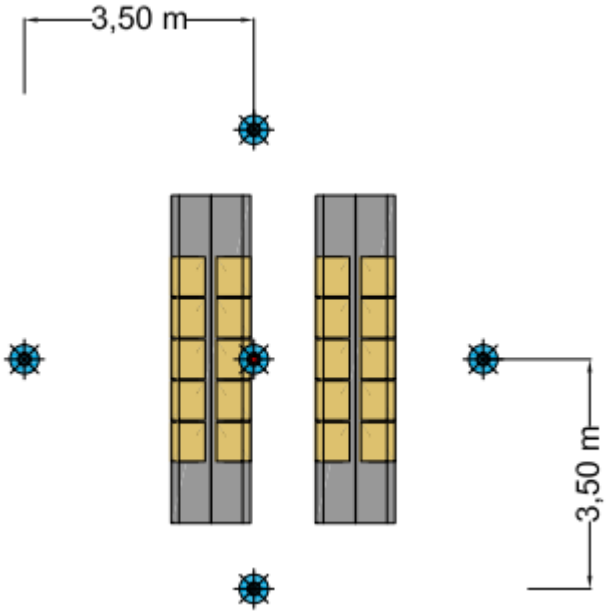
3.3.1.2 Under 1, block storage



3.3.1.3 Between 4, rack storage



3.3.1.4 Under 1, rack storage



4 MEASUREMENTS

DFL did in all the fire tests use their traceable calibrated measurement equipment. See list of used test equipment in appendix E.

4.1 Pressures.

The system water pressure was measured using a pressure-transmitter fitted to the nozzle pipe system at the most remote location from the water inlet. The data were logged with 1 sec. sample time, using an Agilent data logger and a computer

4.2 Times.

Times were measured on stopwatches and computer.

4.3 Temperatures.

Temperatures were measured using 0.5mm thermocouples type K and plate temperatures

Temperature data were logged with 1 sec. sample time, using an Agilent data logger and a computer. For analysis of temperature results a 30 second average was calculated from the measured temperatures.

4.4 Water flows.

Water-flow was measured with a flow-meter and logged with 1 sec. sample time using an Agilent data logger and a computer.

4.5 Visual recordings.

The events of the fire-tests were video recorded.

5 TEST PROCEDURES

The test where conducted accordingly to VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas and CEN/TS14972 appendix B.

5.1 Test overview

The tests simulate the following storage configurations:

- Block storage ST1
- Rack storage ST5/6

5.1.1 Sprinkler test

For each storage configuration, the following scenarios were tested in different procedures:

- Test 1: Block storage ignition underneath 1 sprinkler as reference test
- Test 2: Block storage ignition between 4 sprinklers as reference test
- Test 3: Rack storage ignition underneath 1 sprinkler as reference test
- Test 4: Rack storage ignition between 4 sprinklers as reference test

5.1.2 Water mist test

For each storage configuration, the following scenarios were tested in different procedures:

- Test 5: Block storage ignition underneath 1 nozzle
- Test 6: Block storage ignition between 4 nozzles
- Test 7: Rack storage ignition underneath 1 nozzle
- Test 8: Rack storage ignition between 4 nozzles

5.2 Test description

1. The test mock-up was checked to be in accordance with the specifications.
2. Measuring devices were placed and checked.
3. The system was pressurized and the pressure adjusted to the correct pressure.
4. Enclosure temperatures were checked.
5. Pump, data-logging and video were started.
6. Fire ignited and stopwatches started (TEST START).
7. Once the first nozzle / sprinkler was activated a countdown of 10min was started.
8. Once the 10 min was passed any remaining fire was manually extinguished (TEST STOP).
9. Once smoke was removed fuel damages was counted and reported.

Throughout the whole tests events such as release of nozzles where timed and noted for later use in the report.

6 REQUIREMENTS AND RESULTS.

6.1 Requirements

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

6.1.1 Determination of the fire loss:

Count the damaged plastic cups. Differentiate between 0% loss, 50% loss and 100% loss when evaluating the cup.

- 0% loss: no temperature-induced discolouration of the plastic, no thermal deformation, no burnt or melted parts (especially rim and bottom of cup);

- 50% loss: slight temperature-induced yellowish discolouration of the plastic, thermal deformation max. 50% of the cup surface, no holes burnt into the plastic

- 100% loss: any loss surpassing the above so that it can no longer be evaluated as 50% loss

6.1.2 Determination of the peak temperatures:

This evaluation refers to the temperatures measured after operation of the first sprinkler / first nozzle.

The temperature curves measured during the test shall be averaged over 30 s (maximum interval between measurements 1 s), and the peak temperatures shall be calculated from the averaged curves.

The average gas temperature at the ceiling is the average value of the three peak temperatures.

6.2 Pass / Fail criteria

The tests have been passed, when the following applies:

- The loss occurring in each individual test carried out with the water mist system is less than the loss occurring in the better (smaller loss) sprinkler test.

- In each individual water mist test the average gas temperature at the ceiling is lower than the average gas temperature at the ceiling in the appropriate sprinkler test.

6.3 Results

Description *(Note: The more unfavorable tests have been conducted but only the needed tests are reported in this table)*	Block storage ST1			
	Below 1 nozzle	Below 1 nozzle	Between 4 nozzles	Between 4 nozzles
	Sprinkler reference	Watermist	Sprinkler reference	Watermist
DFL Test no.	Test O-170126	Test O-170216	Test O-170203	Test O-170227
Installed number of nozzles / sprinklers	5	5	4	4
Number of activated nozzles / sprinklers	3	5	4	3
Operation time of first nozzle from ignition	45 sec	27 sec	1 min 07 sec	39 sec
Water pressure	1.5 bar	6 bar	1.5 bar	6 bar
Nominal water flow	294 l/min	232.5 l/min	392 l/min	139.5 l/min
Ceiling height	4m	4m	4m	4m
Nozzle / sprinkler spacing	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m
Density	8 mm/min	3.8 mm/min	8 mm/min	3.8 mm/min
Gas Temperature measurements				
Peak 1 temperature	367.93°C (TC2)	227.90°C (TC2)	186.13°C (TC1)	93.51°C (TC1)
Peak 2 temperature	501,56°C (TC3)	231.22°C (TC3)	205.93°C (TC3)	91.23°C (TC3)
Peak 3 temperature	349.65°C (TC4)	213.31°C (TC4)	230.26°C (TC4)	96.25°C (TC4)
Peak (1-3) average	406,38°C	224.14°C	207.44°C	93.66°C
Fuel damage in procent	73%	63%	70%	60%
TEST PASSED	NA	Yes	NA	Yes

Description *(Note: The more unfavorable tests have been conducted but only the needed tests are reported in this table)*	Rack storage ST5/6			
	Below 1 nozzle	Below 1 nozzle	Between 4 nozzles	Between 4 nozzles
	Sprinkler reference	Watermist	Sprinkler reference	Watermist
DFL Test no.	Test O-170208	Test O-170306	Test O-170314	Test O-170302
Installed number of nozzles / sprinklers	5	5	4	4
Number of activated nozzles / sprinklers	4	5	4	4
Operation time of first nozzle from ignition	2 min 13 sec	1 min 18 sec	2 min 26 sec	2 min 51 sec
Water pressure	1.5 bar	7 bar	1.5 bar	7 bar
Nominal water flow	392 l/min	232.5 l/min	392 l/min	186 l/min
Ceiling height	4m	4m	4m	4m
Nozzle / sprinkler spacing	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m	3.5m x 3.5m
Density	8 mm/min	4.1 mm/min	8 mm/min	4.1 mm/min
Gas Temperature measurements				
Peak 1 temperature	245.74°C (TC4)	325.17°C (TC4)	293.79°C (TC4)	329.03°C (TC4)
Peak 2 temperature	392.36°C (TC5)	286.38°C (TC5)	596.17°C (TC5)	183.40°C (TC5)
Peak 3 temperature	NA	NA	NA	NA
Peak (1-3) average	319.05°C (TC2)	305.78°C	444.98°C	256.22°C
Fuel damage in procent	76%	64%	73%	62%
TEST PASSED	NA	Yes	NA	Yes

7 CONCLUSION.

The Model OH-PX2 nozzle has successfully been fire tests to VDS test method - selected OH-3 sales, storage and technology areas enclosed by OH-1 areas and CEN/TS14972 appendix B in 4m ceiling height.

In all tests did the nozzle perform better than the 8mm/min density reference sprinkler in regards to temperature control, fuel damage control and fire-spread.

The Model OH-PX2 nozzle (k-factor 19) where installed with 3.5m spacing and used a water pressure of 6 bar for Block Storage tests ST1 and 7 bar for Rack Storage tests ST5/6.

APPENDIX A – Test data overview

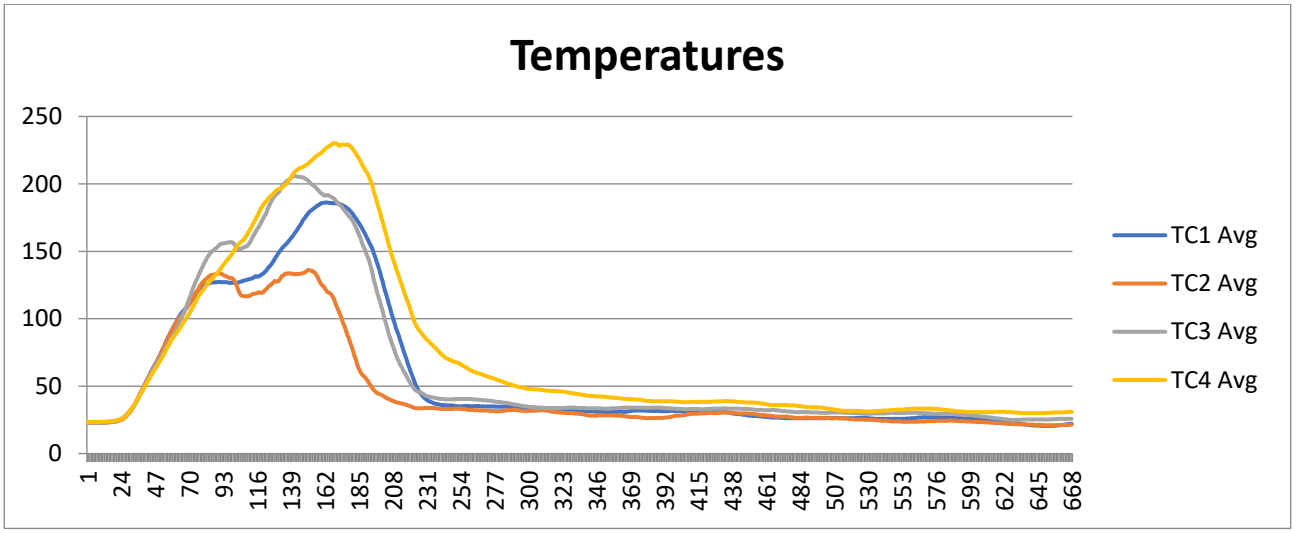
The following is valid for all graphs in appendix A:

- Timeline is shown in seconds.
- Temperatures are shown in degrees C.
- The temperature graphs shown are only the “30 average gas ceiling” temperatures.

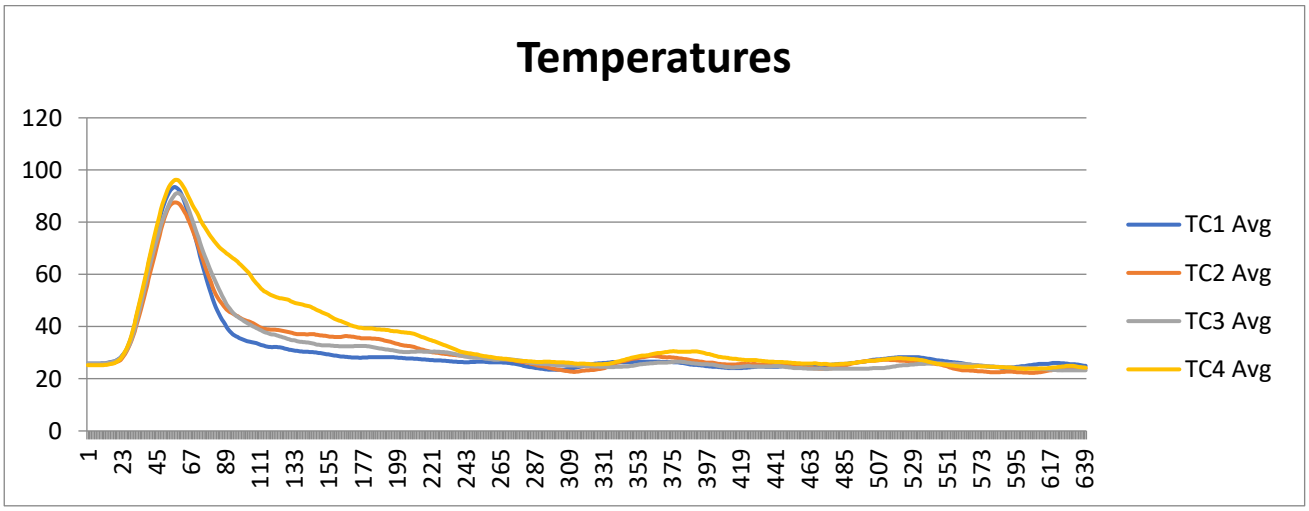
Values also logged in the fire tests but not reported in this report are:

- Radiation temperatures.
- Water flow rate.
- Water pressure
- Above ignition temperature.
- Centre gas ceiling temperature.

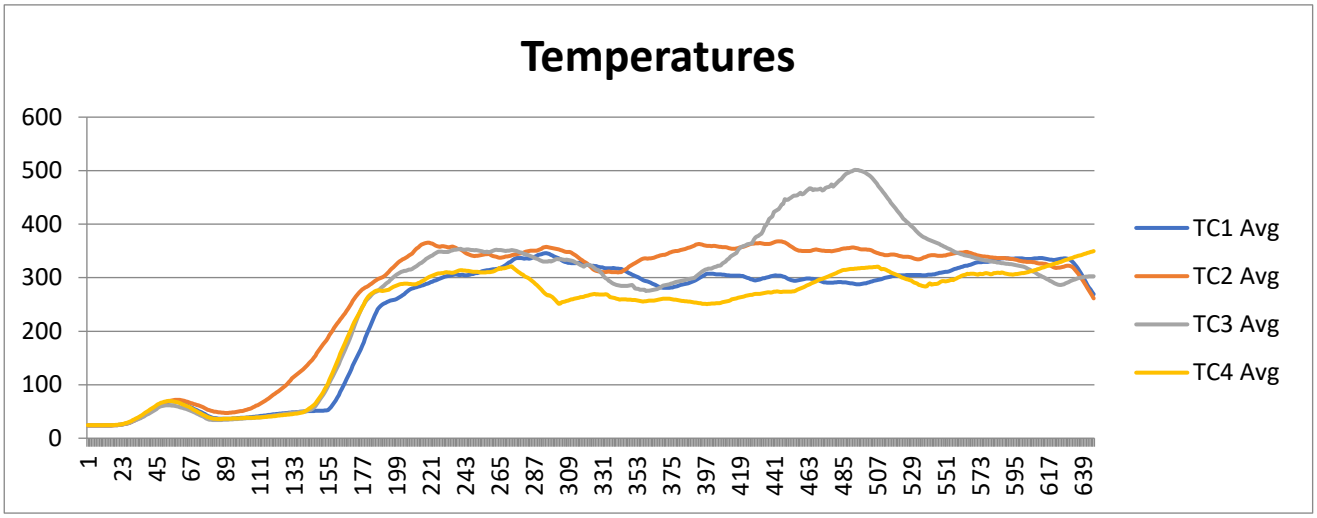
Test 170203-1 – Block fuel - Between 4 sprinklers.



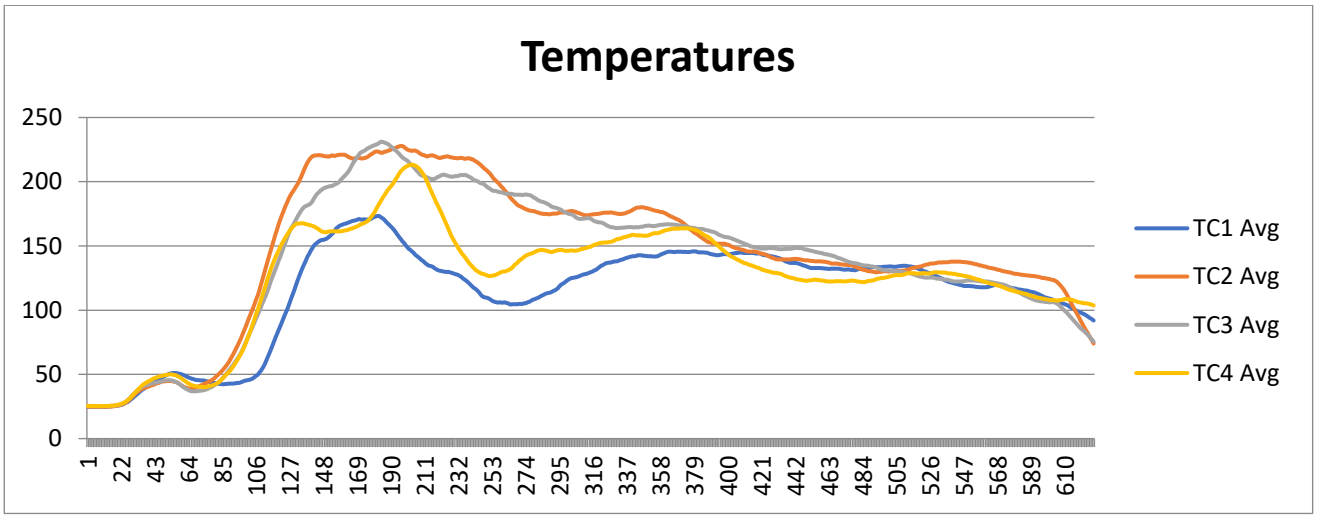
Test 170227-1 – Block fuel - Between 4 nozzles



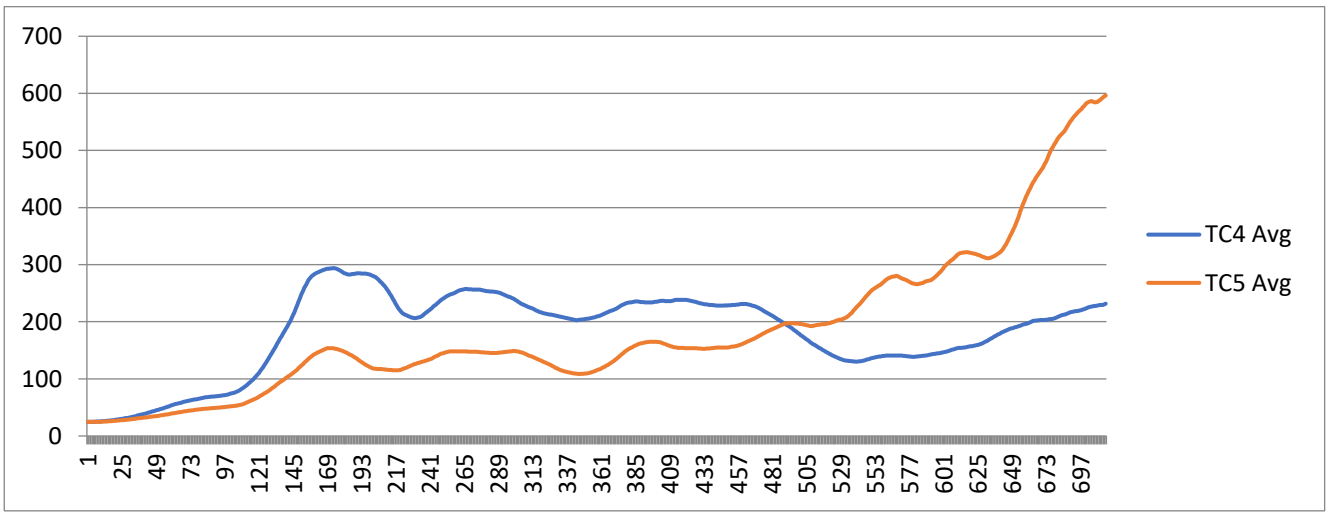
Test 170126-1 – Block fuel – Below 1 sprinkler



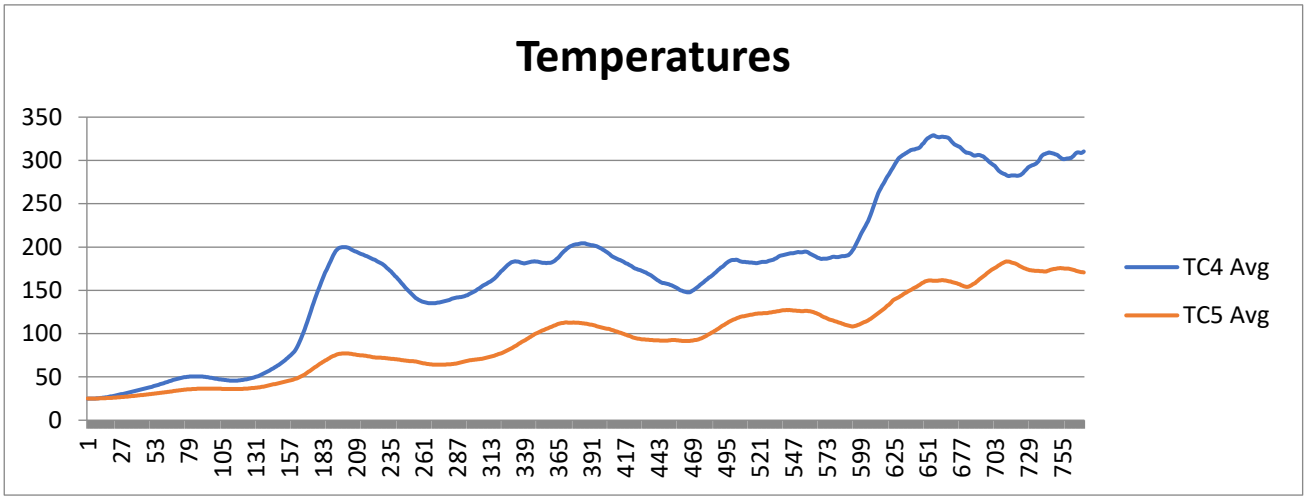
Test 170216-1 – Block fuel – Below 1 nozzle



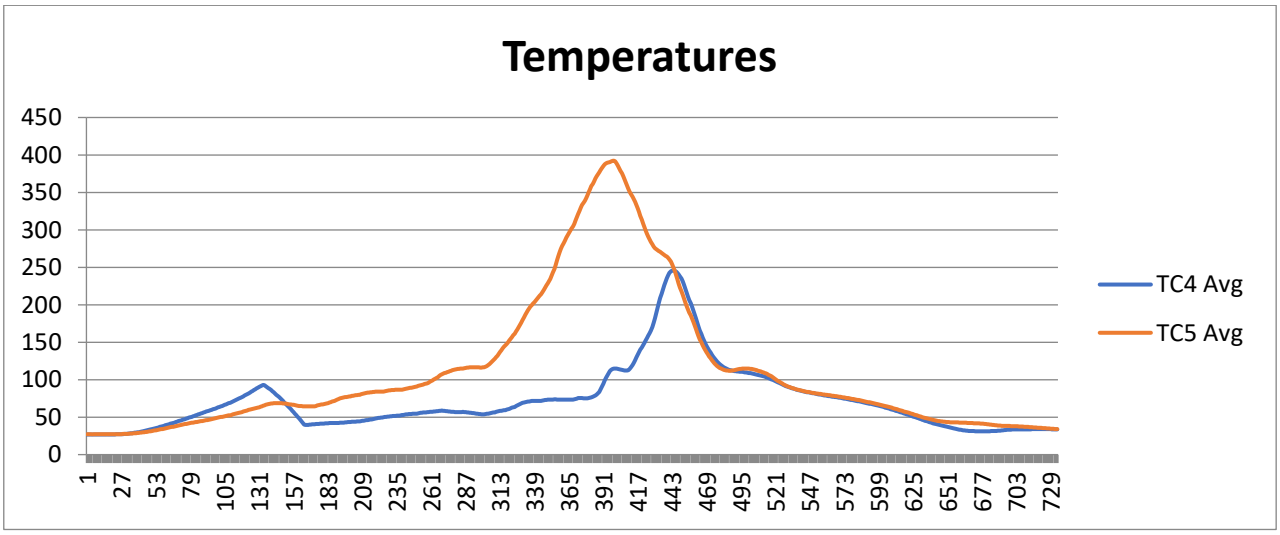
Test 170314-1 – Rack fuel – Between 4 sprinklers.



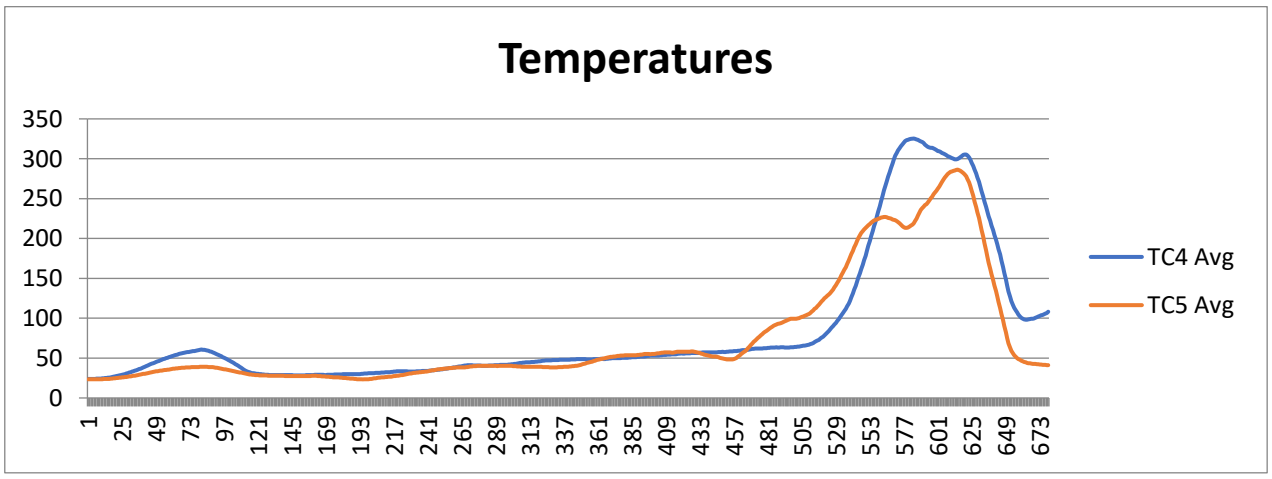
Test 170302-1 – Rack fuel – Between 4 nozzles.



Test 170208-1 – Rack fuel – Below 1 sprinkler.

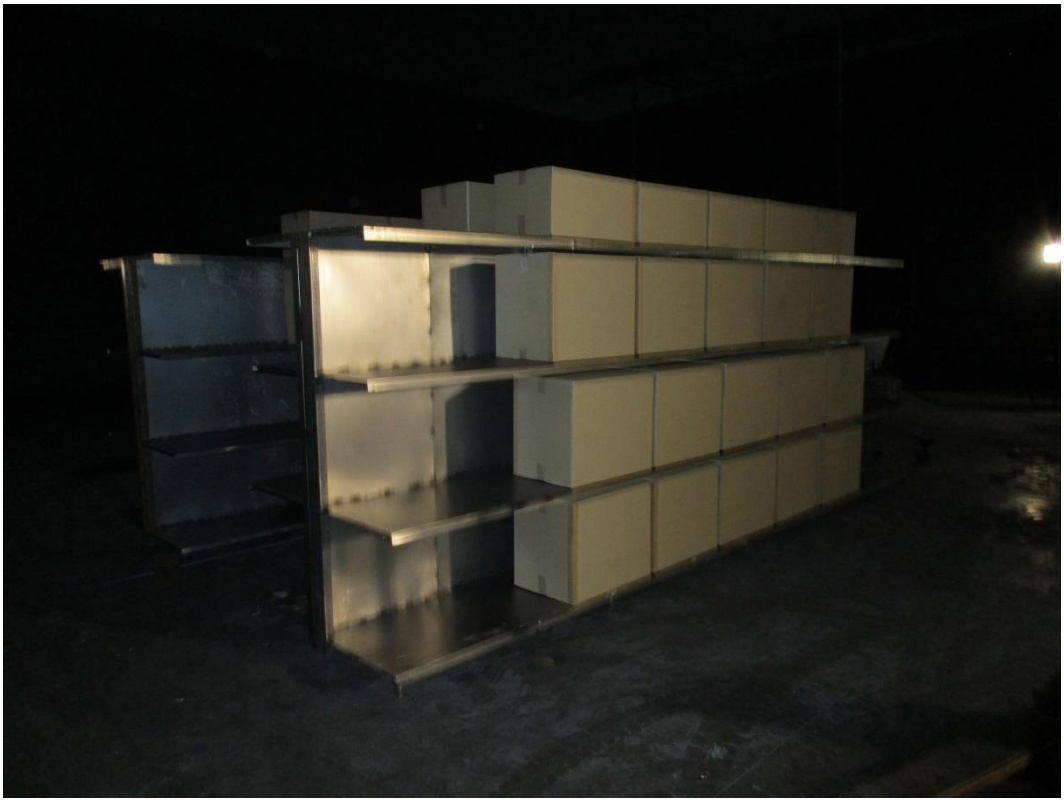


Test 170306-1 – Rack fuel – Below sprinkler.



APPENDIX B – Pictures from test.

Rack Storage tests ST5/6 setup



Block Storage tests ST1 setup.

APPENDIX C – Watermist nozzle datasheet

Datasheet
Pendent Automatic Low Pressure Water Mist Nozzle
Model: OH-PX2

Description

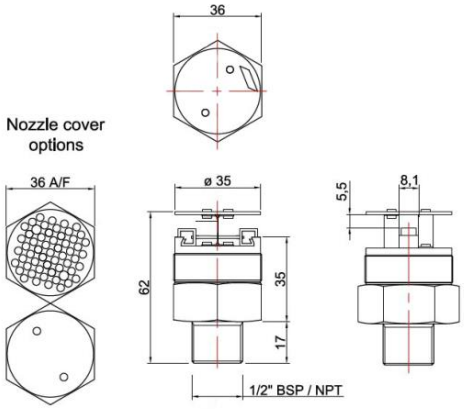
The VID Fire-Kill Low Pressure Water Mist Nozzle Model OH-PX2 is a patented automatic, semi-concealed low pressure water mist nozzle. Ideal for installations such as fire protection of selected OH-3 sales, storage and technology areas enclosed by OH-1 areas with smooth ceilings and walls, and it provides a highly reliable and enhanced firefighting performance along with low water requirements, which is typical for VID Fire-Kill water mist nozzles. The nozzle is available in custom finishes and optional colored finishes, thus making the OH-PX2 blend in with almost every type of surface.

Approvals

The OH-PX2 has been tested in accordance with VdS Test Assembly and Requirements – OH3 (ST1 and ST5/6), document ref VdS OH3 de V1 29.09.2011.

The OH-PX2 can protect selected OH-3 sales, storage and technology areas enclosed by OH-1 areas. The test is carried out with third party witness from DnVGL

Dimension



General Description	
Minimum water pressure	7 bar
Maximum working pressure	16 bar
K-factor (metric)	19 (l/min@1 bar)
Nominal release temperatures	57°C, 68°C, 79°C, 93°C, 141°C
Drop size	DN_{90} < 300 µm
Application	
Coverage Area	12,25 m^2 (3,5m x 3,5m)
Distance to wall	Max 1,75 m
Height	Max 4.0 m
Specific Description	
Dimension	See fig.
Weight	0.211 kg
Housing	Brass
Coating	NiSn
Strainer	Stainless Steel
Thread	½" BSP/NPT
Standard Finish	NiSn Chrome White RAL 9010
Other Finish	Other RAL colors
Cover options	Solid Penetrated
Hydraulic System	
Water density	4.1 mm/m^2
Design area and system operation time	As for sprinklers installed in similar hazard groups
Related Products	
Name	Model
Alarm Valve	WAC
OH Rosette	OH-R2-T / OH-R2-TH
OH Pipe Spanner	OH-S36

Datasheet
Pendent Automatic Low Pressure Water Mist Nozzle
Model: OH-PX2

Installation

The OH-PX2 nozzles are installed recessed in a ceiling, using the OH-S36 nozzle spanner, as not to damage the nozzle or the surrounding ceiling, with a maximum distance of 3,50 m between nozzles and a maximum distance of 1,75 m to any walls needing protection.

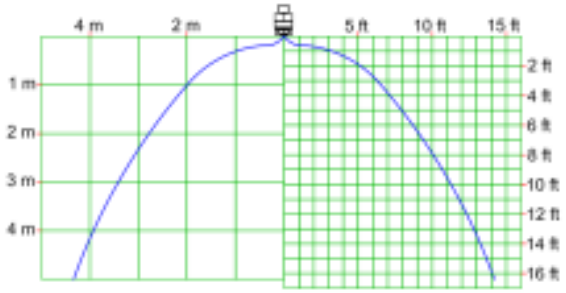
The OH-PX2 should only be installed in clean, non-corrosive pipe systems, which do not cause galvanic corrosion to the nozzle, system components or pipe hangers, and with clean rinsed internal surfaces free of impurities. The water quality should be free of chlorides and impurities

After successful installation of the nozzle, the OH-R2-T or OH-R2-TH rosette is screwed on to the nozzle to complete the installation process.

The system piping should be in materials found acceptable by the authorities having jurisdiction.

Spray Pattern

Below is a diagram illustrating the spray pattern of OH-PX2.

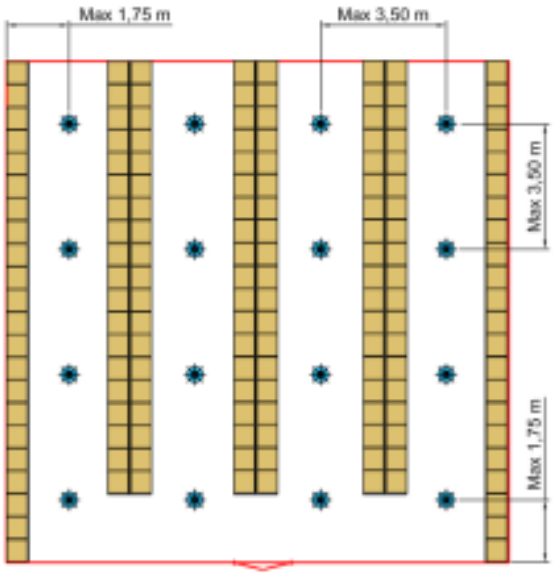


Caution

The OH-PX2 is a fragile component containing a glass release element under pressure. Only VID OH-Spanners should be used in the installation of the OH-PX2 nozzle.

Dropped or otherwise damaged nozzles should not be installed.

Typical lay-out



Contact

For further information on the OH-PX1 or similar nozzles, please contact your nearest sales office. Find your nearest sales office at www.vid.eu

APPENDIX D – Reference sprinkler datasheet.

GW–S Automatic Sprinkler
SSP (Pendent)
15mm, K-80, Special Response

GW SPRINKLER A/S

DESCRIPTION
The GW-S sprinkler series offers high quality, European manufactured, modern compact design, that meet the rigid test requirements set out by the world leading approval authorities. The unique GW PTFE / double groove seal in combination with high end heat responsive frangible glass bulbs guarantee durable operation and reliable performance. The use of precisely CNC-machined hot forged frames eliminates the risk of porosity.
All manufacturing and testing processes are performed strictly in compliance with our quality management system, certified to ISO 9001.

APPLICATION
GW-S SSP Special Response sprinklers are used in fixed fire protection systems. Care must be exercised that RTI, orifice size, temperature rating, deflector style and sprinkler type is in accordance with the latest published standards i.e. EN12845, CEA4001 or NFPA13.
The SSP (pendent) type sprinkler will pass 100% of the water in the flow direction with a 140° spray angle - generating a parabolic spray pattern.

TECHNICAL SPECIFICATION

STYLE	SSP (pendent)
RTI-VALUE	50 < RTI < 80, Special Response
GLASS BULB DIAMETER	Ø 4 mm
TEMPERATURE RATING	57, 68, 79, 93, 141, 182°C
ORIFICE:	Ø 11 mm
K-FACTOR:	80 lpm / bar$^{1/2}$
NOMINAL THREAD:	15 mm (1/2" BSPT), length: 14mm
MAX. WORKING PRESSURE	12 bar
SYSTEM TEST PRESSURE	20 bar
FACTORY TEST PRESSURE	35 bar
WEIGHT	69 grams
OVERALL LENGTH	52 mm
DEFLECTOR DIAMETER	Ø 32
FINISHES	Natural (Brass), chrome plated, polyester powder coated (RAL)

APPROVALS

VdS (Germany)	VKF (Swizerland)			CE to EN12259-1

NOTE:
Not all bulb temperatures and material options are approved by all authorities.
Please consult GW for specific information.

OPTIONS
For improved corrosion resistance the GW-S series can be supplied (on request) in superior materials, such as: stainless steel SS316 or 254SMO, Nickel Aluminium Bronze and even in Titanium. Also available with ENP plating (electroless nickel plating).
Brass sprinklers are also available in: 10mm (3/8") and 20mm (3/4") in style SSP, SSU, CUP and WUP.
Consult GW Sprinkler for further options.

INSTALLATION
Install SSP type sprinklers ONLY in the pendent position.
Modern sprinklers incorporate highly sensitive and fragile glass bulbs and the utmost care must be taken during handling and installation not to damage the glass bulb in any way!

GW Sprinkler A/S
Kastanievej 15,
DK-5620 Glamsbjerg
e-mail: sales.dep@gwsprinkler.com
web: www.gwsprinkler.com

Data Sheet No.: **GW SH025 1002 A**

Date: 15.06.2016

GW–S Automatic Sprinkler
SSP (Pendent)
15mm, K-80, Special Response

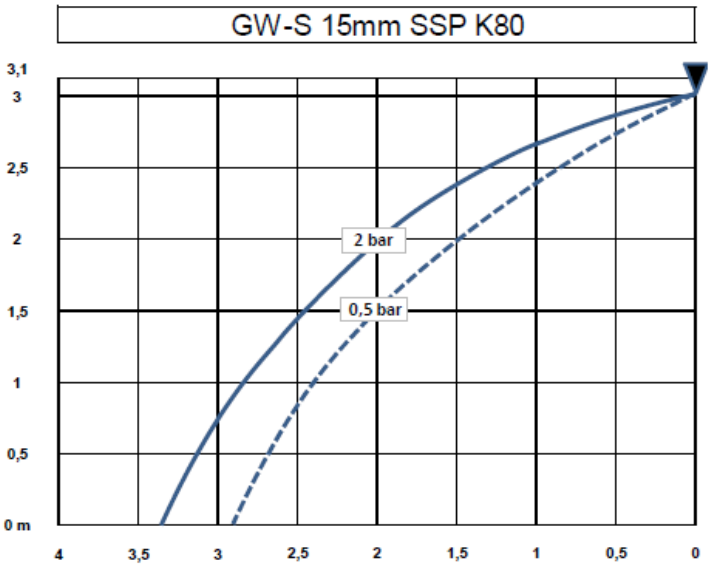
GW SPRINKLER A/S

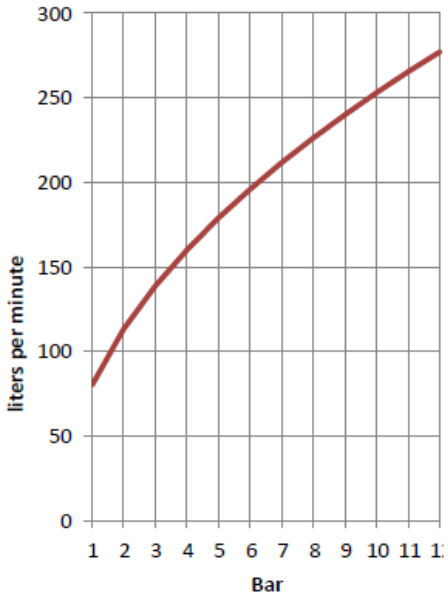
Never install sprinklers that have been dropped, damaged or fully or partly lacks glass bulb fluid.
Install only sprinklers in pipework that is in place to prevent mechanical damage of the sprinklers.
Use only GW sprinkler wrench or box-spanner. Recommended torque to obtain leak tight joint: 10 – 20 Nm.
Brass sprinklers should only be installed in non-corrosive environments and environments free of ammonia, chloride vapors and cleaning solutions.

MAINTENANCE

The sprinkler system should be inspected and maintained according to e.g. NFPA 25.
Sprinkler heads should be inspected on an annular basis. Ensure that the sprinklers are not used for hanging any objects, and do not show signs of leakage or corrosion. Sprinklers found to be painted, coated or otherwise altered after leaving the factory must be replaced. Also replace any sprinkler that has a cracked bulb or has lost liquid from its bulb.
Dusty sprinklers can be gently cleaned using a feather duster – or similar gentle method/tool.
Automatic sprinklers are recommended to be inspected, tested and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.
GW-S sprinklers are supplied in special purpose built Styrofoam boxes for maximum protection – and spare sprinklers should always be stored / kept in the original packaging until installation.

WATER DISTRIBUTION & FLOW GRAPH





GW Sprinkler A/S
Kastanievej 15,
DK-5620 Glamsbjerg
e-mail: sales.dep@gwsprinkler.com
web: www.gwsprinkler.com

Data Sheet No.: **GW SH025 1002 A**

Date: 15.06.2016

APPENDIX E – List of used measuring equipment

Datalogger:	DFL-014-M
Multiplex:	DFL-016-M og DFL-017-M
Flowmeter:	DFL-013-M
Pressure transmitter:	DFL-017-M
Thermocouples:	DFL-107-M

APPENDIX F – Official statement

Svalbardvej 13
DK-5700 Svendborg
Tel: +45 6262 1024
VAT no.: 2921 3542

D-20191031-1

Official statement

This confirmation, made as an appendix for DFL Test Report No. 160812-181A.1, clarifies that the tests documented in DFL Test Report No. 160812-181A, was conducted accordingly to VDS test method "selected OH-3 sales, storage and technology areas enclosed by OH-1 areas" + CEN/TS14972 annex B.

The data sheet APPENDIX D - "Reference sprinkler datasheet" in test report no. 160812-181A, is not the correct data sheet.

The test report no. 160812-181A.1 with the correct "Reference sprinkler datasheet" hereby replaces test report no. 160812-181A.

Test report no. 160812-181A is from today´s date hereby void.

The following documents, purchase invoices and confirmation from the supplier of the reference sprinklers confirms that the correct sprinklers have been used in the test.

Svendborg 2019-10-31

Ove Andersen
Laboratory manager

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