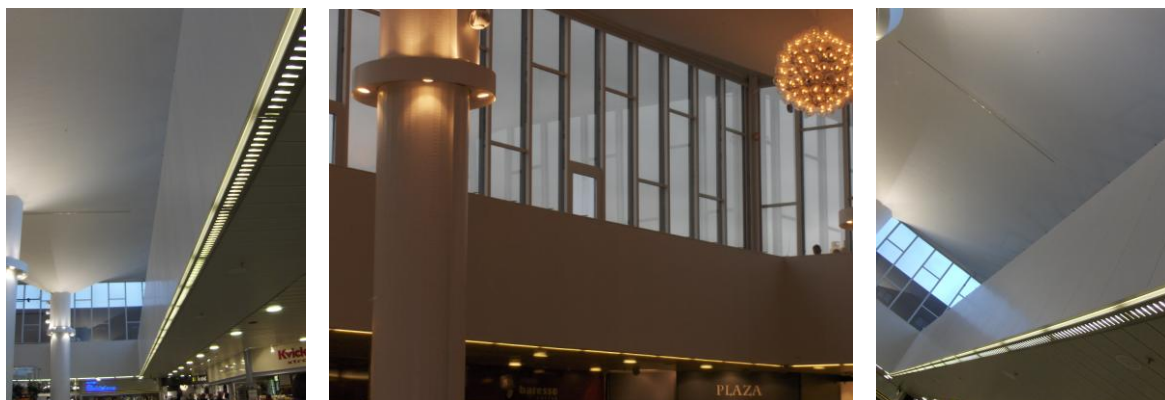


Atrium Fire Protection System

- Model APS



1. Applications:

VID FIRE-KILL's Atrium Fire Protection Systems Model APS are developed for fixed installed fire protection of atriums and other similar locations without maximum limitations to heights and lengths of the rooms.

Atrium locations are defined as tall indoor areas with a large floor area, and a low fire load per area.

Atriums are common in larger buildings, hotels, office buildings, high rise buildings, and in passenger ships, etc.

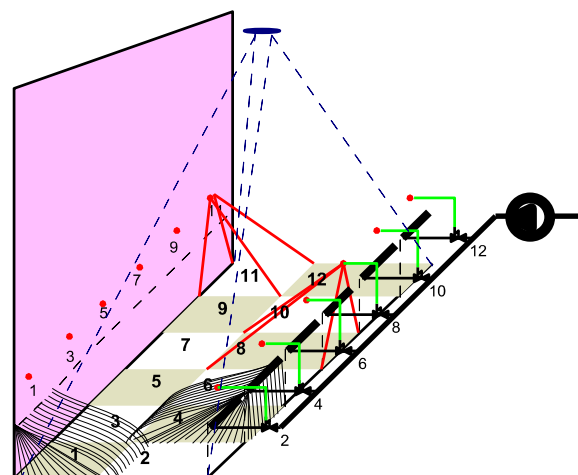
2. Means of fixed fire protection in Atriums.

Effective fire protection of atrium areas with Automatic sprinkler heads or automatic water mist nozzles installed in the atrium ceilings may be handicapped by:

1. High ceiling heights, which cause slow sprinkler respond times, with risks of that no sprinklers activate, or in cases with large atrium fire that many sprinkler heads risk to operate requiring more water than the capacity of the water supply system.
2. Draft and ventilation in the atrium may cause the activation of sprinkler heads, which are not installed above the fire.
3. Thermals from fires may carry the sprinkler water or water mist sprays away from the fire.
4. The activation of overhead sprinkler heads cools the air, and brings the smoke layer from the ceiling level down to the floor level.
5. System maintenance is difficult because of the high system installation heights.

Fire fighting with nozzles installed on the atrium walls distributing water mist sprays horizontally into the atrium volume solves the problems of overhead sprinkling in atriums. However, fires in the atrium space, which not very close to the atrium walls will not activate automatic side wall nozzles in atriums.

The atrium floor areas should therefore be divided into a number of Atrium Floor Zones (AFZ). A flame detector should monitor each AFZ for fires (red lines). Each flame detector should via a panel be connected to a Zone Valve (Green lines). The Zone Valve controls the water access to the individual Nozzles Pipe and the nozzles protecting the AFZ area





Atrium Fire Protection System

- Model APS

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3. VID FIRE-KILL Model APS - System characteristics:

VID FIRE-KILL Model APS Atrium System offers a unique system design.

The system is very discrete in the atrium room. Only on a line of very small cylindrical button nozzles is visible on the atrium wall. The buttons appears in gold, silver or ral-colours. Their size is only \varnothing 14mm x 15mm, and they are installed in 3m – 7m height with 1m spacing.

VID FIRE-KILL Model APS is a Low Pressure Water Mist system. Model APS systems provide fire fighting with a horizontal water mist spray from the atrium wall.

VID FIRE-KILL Model APS Hydraulic systems are characterised by:

	Type A	Type B	Type C
Atrium widths: (maximum)	16m	20m	26m
Atrium heights	no limitations	limitations	limitations
Atrium lengths	no limitations	limitations	limitations
Working water pressures	5 – 16 bar	6- 16 bar	10- 16 bar
Water coverage (minimum)	2mm/min	2,3mm/min	2,6mm/min
Typical Atrium Floor Zone	6m x 8m	6m x 10m	6m x 13m

- All system components are available from VID FIRE-KILL. (www.vid.eu)
- Simple installation and maintenance.
- VID FIRE-KILL Model APS Atrium Fire Protection System may be designed as a branch on conventional sprinkler or Low Pressure Water Mist Systems, which have the required water supply capacity (flow and pressure), and which fulfils the requirements to water and pipe qualities on the water ways from the water supply to the VID FIRE-KILL Model APS components.
- VID FIRE-KILL Model APS Atrium Fire Protection System requires pipes to have internal corrosion proof or corrosion protected surfaces. Galvanized piping is acceptable, provided that the whole wetted area is uniformly plated with a solid layer of sink, and that no lose sink is present in the pipes, and that the authority having the jurisdictions accepts the use of galvanized piping. The internal surfaces and the water quality of galvanized piping should be regular checked, and galvanized pipes showing any internal corrosion should be immediately replaced with new. The water should be free of impurities and salts.

VID FIRE-KILL Model APS Electrical detection and activation systems are characterised by:

- Power supply: 230Vac 50Hz
- Panels: VID FIRE-KILL Model BB-PA (4 zone panels) w. power back-up
- Detectors: NC-type (circuit monitoring)
- Detection: 1st warning – Smoke detection with fire alarm.
2nd Addressable flame detection >> system activation.
- Setting and tests of panel: The panel has PC interface for adjustments of settings and for tests functional tests of panel performances.

4. Approval tests Model APS.

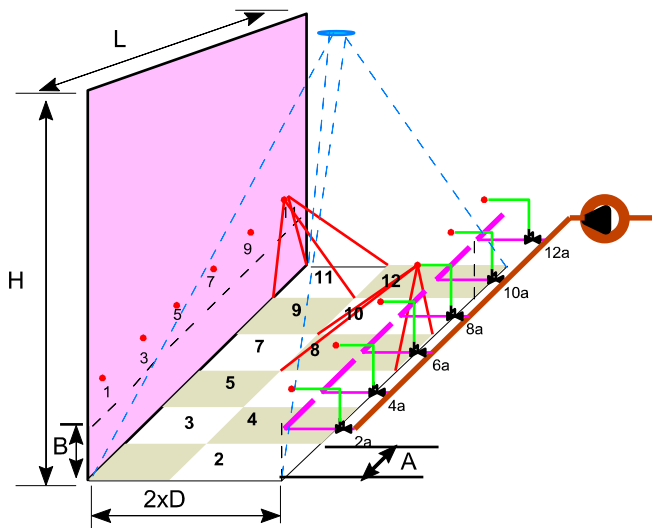
Model APS systems have been tested in full scale atrium fire tests by The Danish Fires Laboratories (DFL) in accordance with tests Method No. TM 70111-04 (Fire fighting tests of Atrium Fire Protection Systems in full scale atrium fires).

DFL TM 70111-04 fire test method is available on www.dafila.com

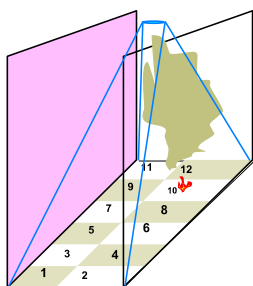
5. VID FIRE-KILL Model APS – System descriptions.

VID FIRE-KILL Model APS Systems are suitable for fixed installation in atriums with:

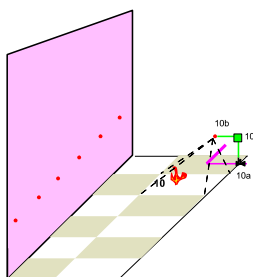
Length (L):	unlimited
Height (H):	unlimited
Width (2xD) Type A	max. 16m
Type B	max. 20m
Type C	max. 26m
Nozzle wall height (B):	3m – 7m



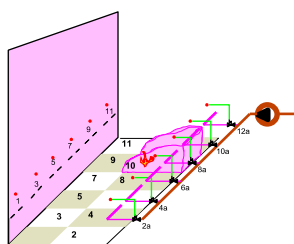
5.1 Atrium Fire Scenario:



- A fire ignites in Atrium Fire Zone no. 10
- The smoke detection system detects the fire.
- The smoke detection system automatically sounds Fire Alarm
- After a pre-set time delay, the smoke detection panel automatically activates the flame detector system with a flame detector for each AFZ area.



- The Flame Detector (10b) detects the fire in AFZ No. 10.
- The Flame Detector provides a signal to the Flame Detector Panel (10b).
- The Flame Detector Panel provides an activation signal to the Zone Valve Assembly controlling the access of water to AFZ No. 10



- The Zone Valve Arrangement of AFZ No. 10 activates.
- Water flows from the wet supply pipe to the N-pipe of AFZ no. 10.
- The pressure loss in the supply pipes activates the water supply system to start the pumps to maintain the water pressure.
- The water flow makes the sprinkler alarm valve sound an alarm.
- The N-Pipe distribute water mist into AFZ no. 10.
- The fire is suppressed and spread of fire is avoided.

6. Electric detection systems:

VID FIRE-KILL Model BB-PA Detection & Activation Panel is designed for control of up to four Atrium Fire Protection Zones. Multiple BB-PA panels may be installed in atriums with more than four atrium Fire Protection Zones. Smoke detector and flame detector circuits should have closed circuits in standby.

The BB-PA panel constantly monitors all external and internal circuits. The panel automatically sounds alarm if fault on one or more circuits.

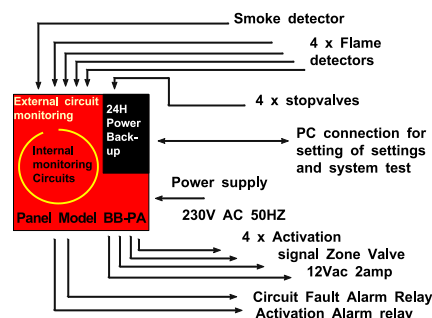
The smoke detector system should cut the electric circuit to the panel, when smoke is detected.

The flame detector should cut the electric circuits to the panel when fire is detected.

The Zone Valve Arrangements should be monitored in such a way that electric circuits are closed when the stop valve is fully open, and the test and drain valve is closed, so that the electric monitoring circuits are cut when the valves are not in their standby position.

The BB-PA panels automatically sound alarm on the alarm relay when an electric monitoring circuit is cut.

BB-PA panels have 24 hour power back-up, and the panels are connected to 230 Vac 50Hz power supply.

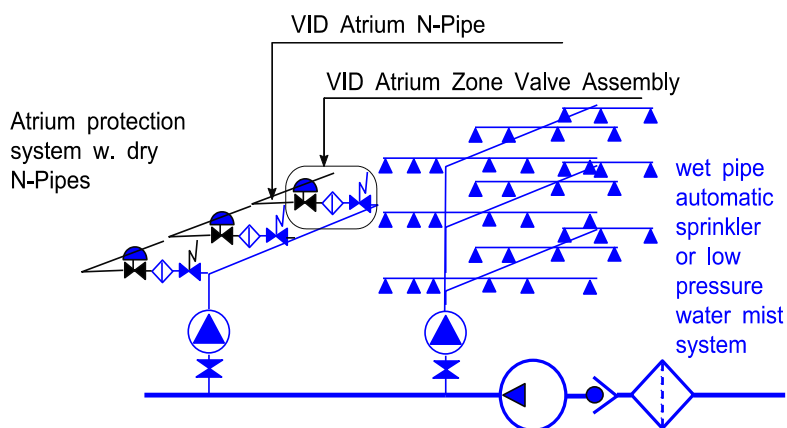


7. Hydraulic suppression system:

The hydraulic VID FIRE-KILL Model APS Atrium Fire protection Systems are Low Pressure Water Mist systems.

The Hydraulic Atrium system may be designed as:

- an independent fire fighting system,
- Or as a part of a larger wet pipe sprinkler or low pressure water mist system.



The system pipes in both the constellations should be clean and without rust, debris and impurities. Pipes should be made of a non corrosive material. Galvanized pipes may be acceptable provided that the sink layer on internal surfaces is homogeneous, that the pipes have no loose sink, and that the pipes and the sprinkler water is frequently checked for loose sink, and internal corrosion of the pipes. Water quality should be clean fresh water with out impurities, debris, or salts. Galvanized pipes should be checked frequently for corrosion on internal surfaces.

Each Atrium Fire Protection Zone (AFZ) is hydraulic fire protected with a VID FIRE-KILL Atrium Zone Valve Assembly and a VID FIRE-KILL Atrium N-Pipe.

The Zone Valve Assembly may be controlled from the BB-PA panel.

Zone Valve Assembly controls the water access to a VID FIRE-KILL Atrium N-Pipe.

The VID FIRE-KILL N-Pipe distributes the water mist coverage into the Atrium Fire Protection Zone.

8. N-Pipes:

N-Pipe Type A is suitable for Atrium Fire Protection Zones with depths up to 8m.

N-Pipe Type B is suitable for Atrium Fire Protection Zones with depths up to 10m.

N-Pipe Type C is suitable for Atrium Fire Protection Zones with depths up to 13m.

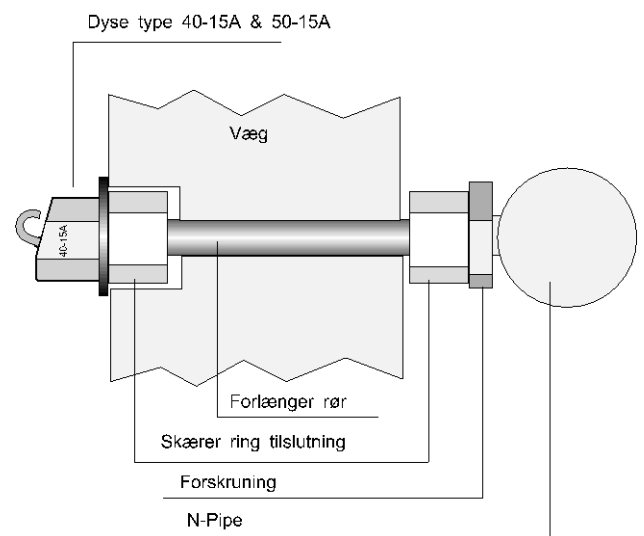
Parameters	Type A	Type B	Type C
Atrium Floor Area Zones (AFZ)	Zone length: Maximum 6m Zone width: Maximum 8m	Zone length: Maximum 6m Zone width: Maximum 10m	Zone length: Maximum 6m Zone width: Maximum 13m
Water pressures	Minimum: 5 bar Maximum: 16 bar	Minimum: 6 bar Maximum: 16 bar	Minimum: 10 bar Maximum: 16 bar
Water consumption per 6m long AFZ (6 nozzles)	Minimum: 91 l/min (6bar) Maximum: 148l/min (16bar)	Minimum: 128 l/min (6bar) Maximum: 208 l/min (16bar)	Minimum: 196 l/min (10bar) Maximum: 248 l/min (16bar)
Water density on atrium floor	Minimum: 1,9 mm/min (6bar)	Minimum: 2,13 mm/min (6 bar)	Minimum: 2,5 mm/min (10 bar)
Water consumption per 6m long AFZ (6 nozzles)	Minimum: 91 l/min (6bar) Maximum: 148l/min (16bar)	Minimum: 128 l/min (6bar) Maximum: 208 l/min (16bar)	Minimum: 196 l/min (10bar) Maximum: 248 l/min (16bar)
Installation height of N-Pipe	3m – 7m	3m – 7m	3m – 7m

Table 1 N-Pipe Data

N-Pipes consist of $\varnothing 25 \times 1.2$ mm stainless steel pipes with ends specified by the customer.

N-Pipes are supply ready for installation together with water mist nozzles and installation procedure.

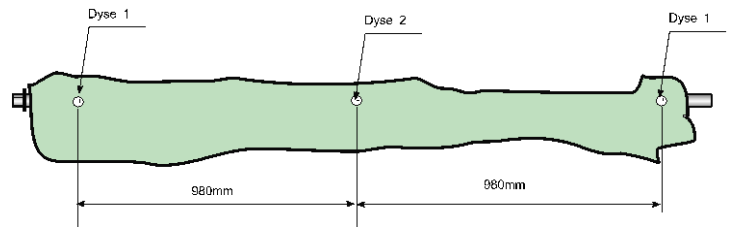
Standard lengths of Atrium N-pipes are 6 m., but can be made in lengths according to the costumer.



Design in Atrium Space:

The N-Pipes may be positioned behind the atrium wall surface.

The only visible indication of nozzles on the Atrium walls is a line of small $\varnothing 14\text{mm} \times 15\text{mm}$ buttons, positioned with maximum 1m spacing 3m – 7m above the floor.

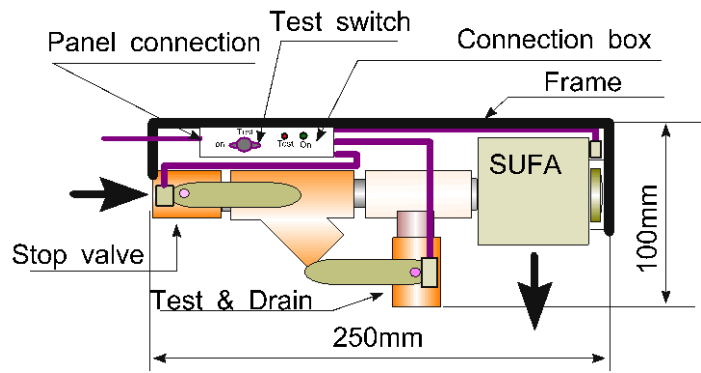


Atrium Zone Valve Assembly with SUFA Valve:

The Atrium Zone Valve Assembly with SUFA Valve is a small compact unit, which is built into a rigid frame structure.

The unit contains the following elements:

- Electric monitored Stop Valve.
- Filter with a mesh size of 1,5mm.
- Electrical activated SUFA Valve.
- Electric monitored test and drain valve.
- Connection Box with Test Switch.



The unit is made of brass. With the only exception of the built in filter, the unit has no water ways less than $\varnothing 5\text{mm}$. The unit does not contain any rubber or other types of gaskets etc. which requires services due to aging. This makes the product a highly reliable for this type of application.

The unit is designed for tests of the system, without having to distribute water into the atrium area.

A switch is positioned on the connection box.

When the switch is in "ON" position the system is in standby position. On an activation signal from the panel, the SUFA valve will trip allowing water to flow from the riser pipe into the N-Pipe to be distributed as water mist in the atrium space.

When the switch is in "TEST" position the SUFA Valve activation circuit is turned off. The panel sounds automatically alarm, indicating that there is a fault in the system. The green LED light turns off indicating that the SUFA Valve Activation Circuit is disconnected.

With the switch in "TEST" position the fire detection system may be tested without risking that water mist is being distributed in the Atrium. The red led light indicates when the panel has provided an activation signal to the SUFA Valve.

When the Red Led Light has switched off, the test switch may be returned to "ON" position. The alarm from the panel disappears and the system has returned to standby waiting to operate in case of a fire in the atrium fire zone.

After activation, the SUFA Valve is replaced with new. The used SUFA Valve may be returned to VID FIRE-KILL to be refurbished.

Atrium Zone Valves are delivered together with installation instruction, and instructions of use. It is recommended to have one spare Atrium Zone Valve during system commissioning.