Getting away from foam systems in hangars

Miguel Martinez
CCO

Date: 2025

VID FIREKILL®
LOW PRESSURE WATERMIST

Hangar Foam: A Solution Looking for a Problem?

With inadvertent hangar foam system discharges on the rise, the aviation industry ponders if they really meet purpose they were intended for.

Accidental hangar fire foam discharge is a growing problem in the aviation industry, with one event occurring on average **every six weeks.**

SAFETY

Accidental Hangar Foam Discharge Strikes Again

Several jets and piston aircraft exposed to corrosive fire-suppression foam

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By **CURT EPSTEIN** • Senior Editor

November 22, 2023

Accidental fire foam discharge claimed another victim when a fire-suppression system was inadvertently activated on October 28 in a city-owned hangar at Dallas-area McKinney National Airport.

Stewartb
Final Approach
Joined: Nov 21, 2014
Messages: 8,539
Location: Wasilla, AK
Display Name:

Display name:
stewartb

Aug 9, 2022 #5

Several years ago I was a subcontractor on a USAF fighter hangar that had a foam fire suppression system. They had an accidental foam release with an F-15 in the hangar. The system was very impressive. It produced 30’ of foam in under a minute. Yes, 30’. The F-15 was badly damaged. It was a really big deal. I wouldn't want to be in there when the foam generator went active.

Ed Haywood

“Several years ago I was a subcontractor on a USAF fighter hangar that had a foam fire suppression system. They had an accidental foam release with an F-15 in the hangar. The system was very impressive. It produced 30’ of foam in under a minute. Yes, 30’. The F-15 was badly damaged. It was a really big deal. ”

“AFFF in a hangar is no joke. The pic below is from a shared hangar in Tulsa. The system suffered an uncommanded discharge with the hangar doors closed.

The foam dumps in huge quantities from the black chutes you see in the ceiling.”

“A fire-suppression system “activated and discharged” at Marine Corps Air Station Cherry Point, North Carolina, in the aircraft hangar”

“Personnel, aircraft, and equipment were in the hangar at the time of the discharge while Marines conducted routine maintenance.”

“Several aircraft and ground equipment were damaged”

A Navy chief damage controlman assigned to precommissioning Unit Gerald R. Ford (CVN 78), observes the testing of aqueous film filming foam sprinklers in the ship's hangar bay in 2017. (MCS3 Cathrine Mae O. Campbell/Navy)

Foam systems impact on Health and Environment

Global fire protection developments in hangars

Welcome to a PFAS free future

- Global discussions on the use of foam systems is growing
- Worldwide aircraft firefighting foam transition plans
- Environmentally safe fire protection for aircraft hangars adopted in NFPA 409
- Fire Safety is going GREEN
- https://vidfirekill.dk/solutions/aircraft-hangars/

Global discussions on the use of foam systems is growing

Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two types of man-made perfluorinated compounds (PFCs) or perfluorinated alkylated substances (PFAS). These compounds have been used in a range of industrial, commercial and domestic products for decades, due to their ability to repel oil, grease, and water.

In particular, high concentrations of PFOS and PFOA have been used to make aqueous film forming foam (AFFF), a component of firefighting foams. These firefighting foams have been used for nearly 50 years on Defence and civilian facilities due to their effectiveness in extinguishing liquid fuel fires

Global discussions on the use of foam systems is growing

PFAS are regarded as 'emerging contaminants' or pollutants which are potentially a threat to human health or the environment. PFOS and PFOA are eliminated slowly from the human body, and concentrations of the chemicals in the body can increase over time if they are continuously consumed in food or water.

As evidence of the health and environment risks has emerged, global manufacturers and other users have moved to replace long-chain PFCs (such as PFOS/PFOA) with shorter-chain PFCs which are currently considered less toxic and less bioaccumulative. However, PFOS/PFOA continues to be used in some circumstances.

CBS NEWS / *January 8, 2018, 7:38 AM*

Are toxic chemicals at Air Force bases leading to cancer, low birth weight?

But the more than 60,000 people in the communities near Peterson Air Force Base may be America's hardest-hit. The EPA said anything over 70-parts per trillion could be dangerous. Some water they tested here had over 1,300 parts per trillion. Additionally, according to a proposed class action lawsuit filed against the foam manufacturers, it has caused serious medical conditions in hundreds of residents.

But the Air Force has responded, spending more than $4 million to provide bottled water and filtration systems. Air Force firefighters now train with water, and for real fires it uses a different fluorinated foam, still containing another type of PFCs, but believed to be safer.

Global discussions on the use of foam systems is growing

"Our chemical regulation system makes us all guinea pigs... because chemicals are assumed safe until proven guilty and they go out into the world... and we are exposed to them with no health information," said Arlene Blum, researcher at the University of California Berkeley.

Defence admits three-year delay in warning people about toxic foam danger

Four Corners / By Linton Besser, Lisa McGregor and Jeanavive McGregor

Posted Sun 8 Oct 2017 at 9:10pm, updated Mon 9 Oct 2017 at 6:41am

Brisbane airport owner sues firefighting agency over toxic foam

Airservices Australia is now the second federal entity to be sued over the firefighting foam contamination scandal

The US has just added two Pfas chemicals to a list of substances 'known to cause reproductive toxicity'. Photograph: United Firefighters Union

Williamtown residents have been asked to follow precautionary advice to minimise their exposure to PFAS chemicals. *(Four Corners)*

Global discussions on the use of foam systems is growing

A 2022 Defense Department analysis, made public by the Environmental Working Group, found that approximately 175,000 service members a year at dozens of bases were being exposed to dangerous levels of PFAS in their drinking water, largely because of the foam washing into groundwater.

The Pentagon in January ordered Defense Department agencies to stop buying fire-suppressing foam that contains PFAS by October, and to phase it out entirely by a year later.

Fatal accidents

Aircraft Hangar High Expansion Foam Incident

On Wednesday January 8, 2014, at Eglin Air Force Base near Valparaiso, Florida, a civilian contractor lost his life after entering the King Hangar in which the high expansion foam (HEF) system had activated. According to the investigation report:

The entire hangar floor was covered with approximately 17 ft (5 m) of HEF (High Expansion Foam) engulfing all but the very top of the vertical fins of the A-10, F-16 and three F-15 aircraft ...

The deceased, age 31, and three other contractor employees, entered the hangar as they "were ‘curious’ to see the foam”. At some point, they became immersed in foam. The cause of death was not published. It may have resulted from extreme disorientation caused when immersed in the foam.

ACCIDENTS

Investigation Into Ohio Hangar Foam Fatality Continues

Officials in Ohio are continuing their investigation into the cause of a fatal accidental hangar foam discharge at Wilmington Air Park.

The deceased man was recovered four hours later after responders used fire hoses to knock down the 20-foot-high foam and flush it out of the hangar, said Wilmington Fire Chief Andy Mason.

Eight firefighters were injured in the incident, some of whom were taken to local hospitals and released after treatment.

Worldwide aircraft firefighting foam transition plans

February 2022

Briefing to Congress on Aqueous Film Forming Foam (AFFF) Replacements and Alternatives

"(a) (1) MILITARY SPECIFICATION.—Not later than January 31, 2023, the Secretary of the Navy shall publish a military specification for a fluorine-free fire-fighting agent for use at all military installations"

New MILSPEC

by Jan 31, 2023

"(b) LIMITATION.—No amount authorized to be appropriated or otherwise made available for the Department of Defense may be obligated or expended after October 1, 2023, to procure fire-fighting foam that contains in excess of 1 part per billion of perfluoroalkyl substances and polyfluoroalkyl substances."

Cannot purchase

foam with >1ppb PFAS

after Oct 1, 2023

"(c) PROHIBITION ON USE.— Fluorinated aqueous film-forming foam may not be used at any military installation on or after the earlier of the following dates:

(1) October 1, 2024.

(2) The date on which the Secretary determines that compliance with the prohibition under this subsection is possible."

Cannot use

PFAS AFFF

after Oct 1, 2024*

**SECDEF may grant two 1-year extensions = 2026*

Environmentally safe fire protection for aircraft hangars adopted in NFPA 409

In 2022, an update to NFPA 409 provided alternatives to the requirement for foam fire suppression systems in all groups of aircraft hangars. Included in the 2022 Edition is the option of an ignitable liquid floor drainage assembly, **as well as a risk-based and performance-based design approach.**

Reasons for getting away from Foam

- PFAS foams are cancerogenic and mutagenic
- PFAS foams are forever pollutants that stays in the ecosystem
- Foams are acids that may damage delicate parts of aircrafts
- People can loose life while being in the hangar during discharge
- Incidental release cost a lot

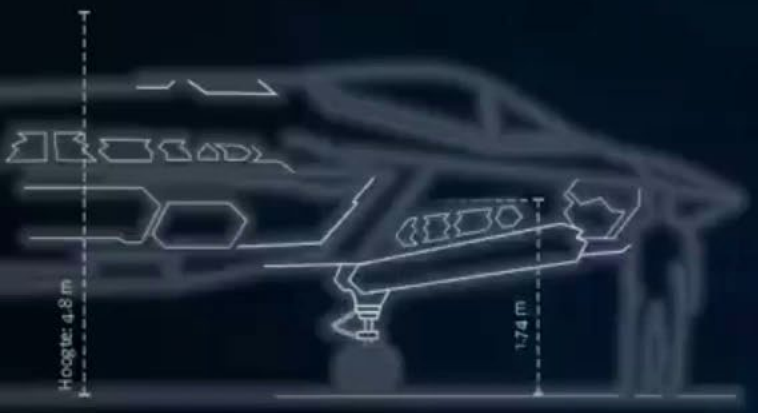
Koninklijke Luchtmacht

FIRST AIRCRAFT ARRIVAL

LEEUWARDEN AIR BASE

F-35

2019



Reasons for getting away from Foam

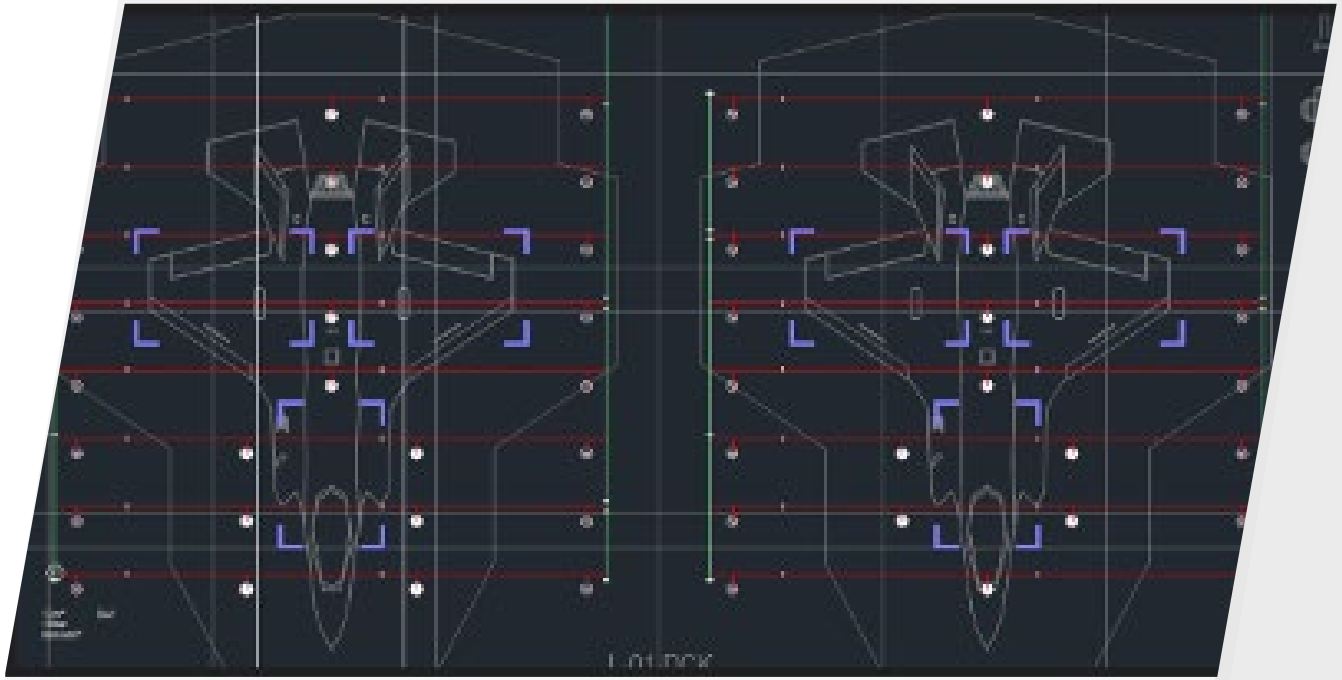
Fire protection in Aircraft Hangars

Objectives fire protection system in hangars:

- Extinguishing
- Protect aircraft
- Control
- Protect adjacent aircrafts
- Protect hangars

Why select a low pressure water mist solution

- Full scale fire tested to a test protocol developed by RISE and a NATO country
- Installed in NATO aircraft hangars protecting F16, F35 and AWAC airplanes
- Fast fire suppression and extinguishing
- Immediate cooling effect upon activation
- Minimal water damage and water consumption
- Floor nozzles results in normal hangar operations
- Safe for people, aircraft, equipment and the environment
- Can be combined with sprinkler technology using same pump and water tank, saving costs and making it more environmentally friendly!



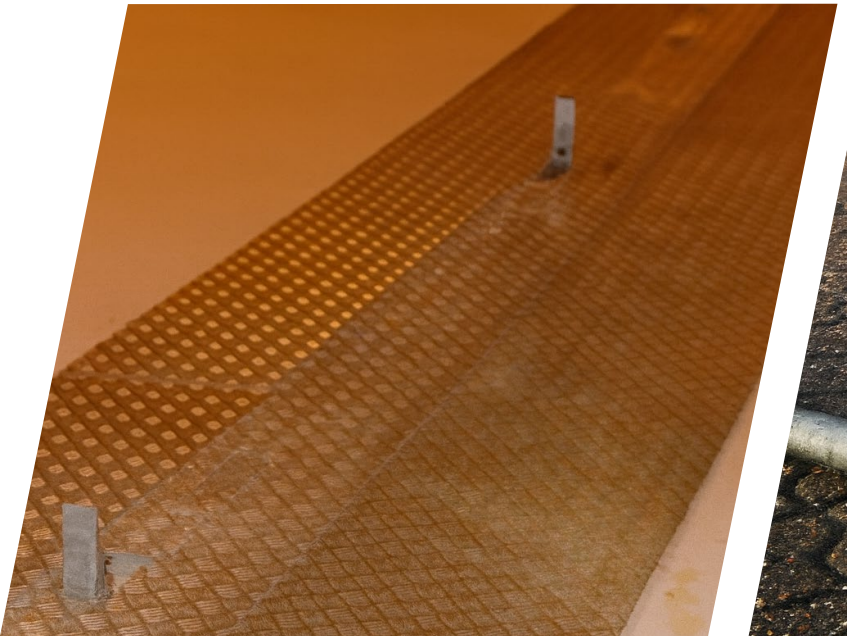
Values compared to other technologies

VID FIREKILL Values Compared to Sprinkler / Foam solution:

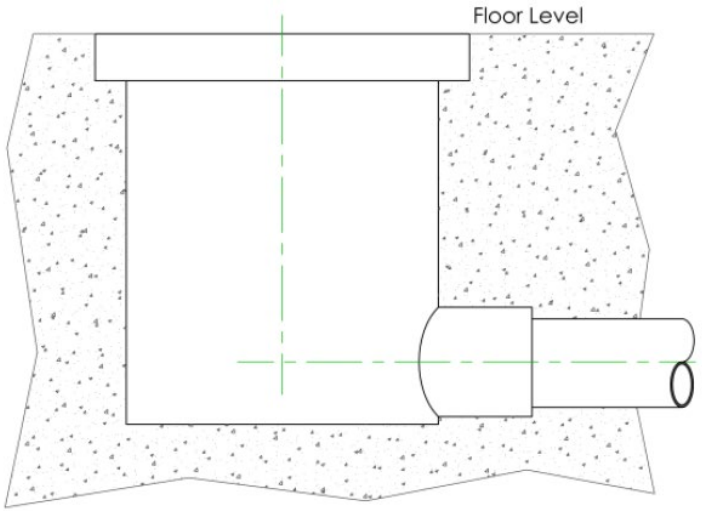
- Use less water and NO foam “green technology”
- Less collateral damage and clean-up in case of an activation of the system
- Smaller footprint as no need for foam tank and water tank and pumps can be reduced
- Cost savings on hangar construction as system weights less
- Reduction on any needed drainage or containment to collect the firewater
- Less corrosion problems and longer lifecycle because use of stainless-steel
- Lower maintenance costs

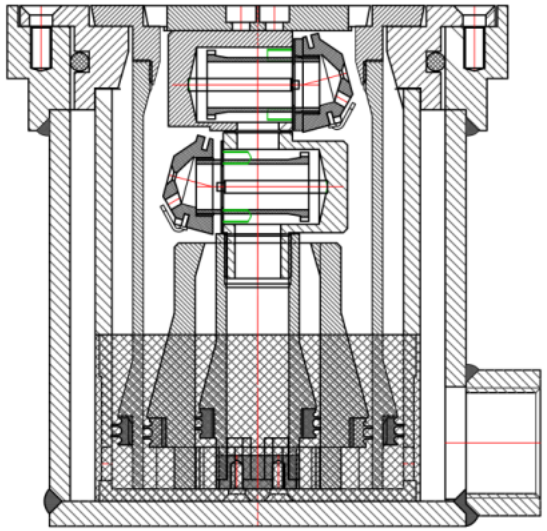
System layout aircraft hangar water mist protection

- The Model F102 is a telescopic one or two way spray nozzle
- Provides fire protection in hangar areas below aircrafts
- The nozzle is installed embedded into the hangar floor
- The Model F202/F302 can also be used during retrofit work of older hangars

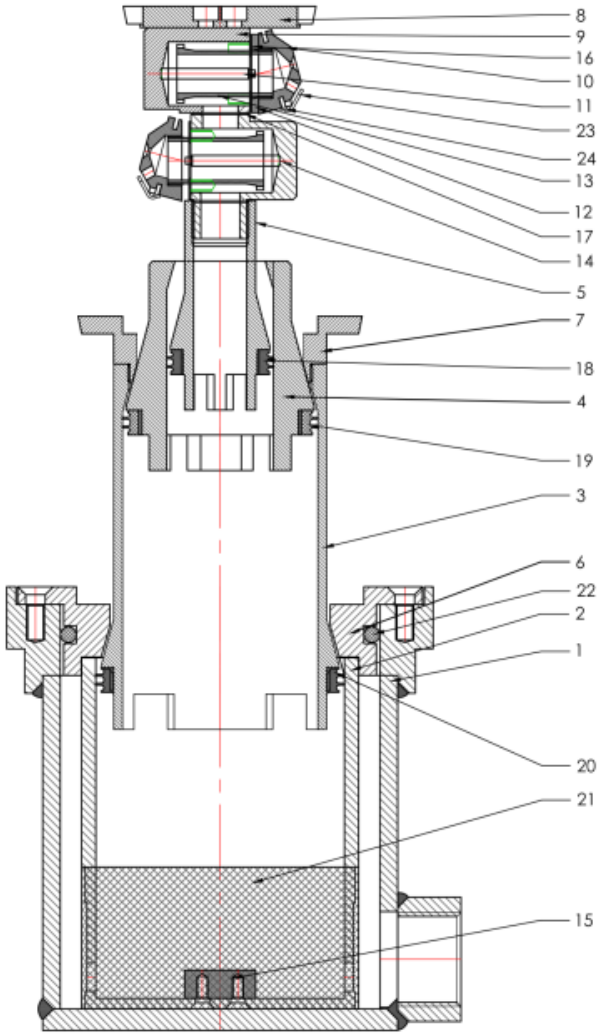


Installation details – floor mounted nozzles

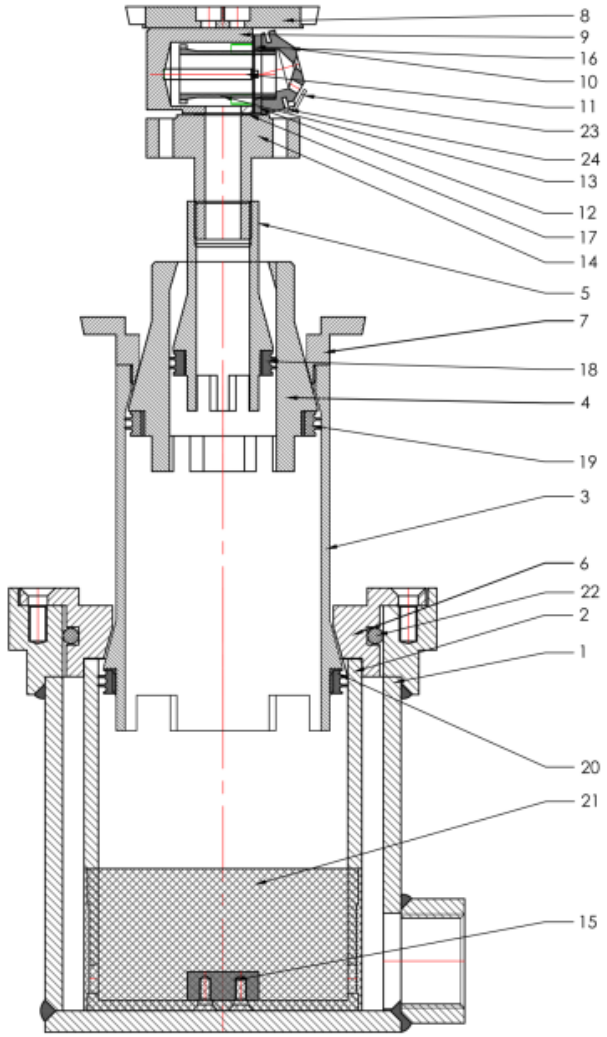




Section Model F102-2 – Ref dwg. no 210310-5205

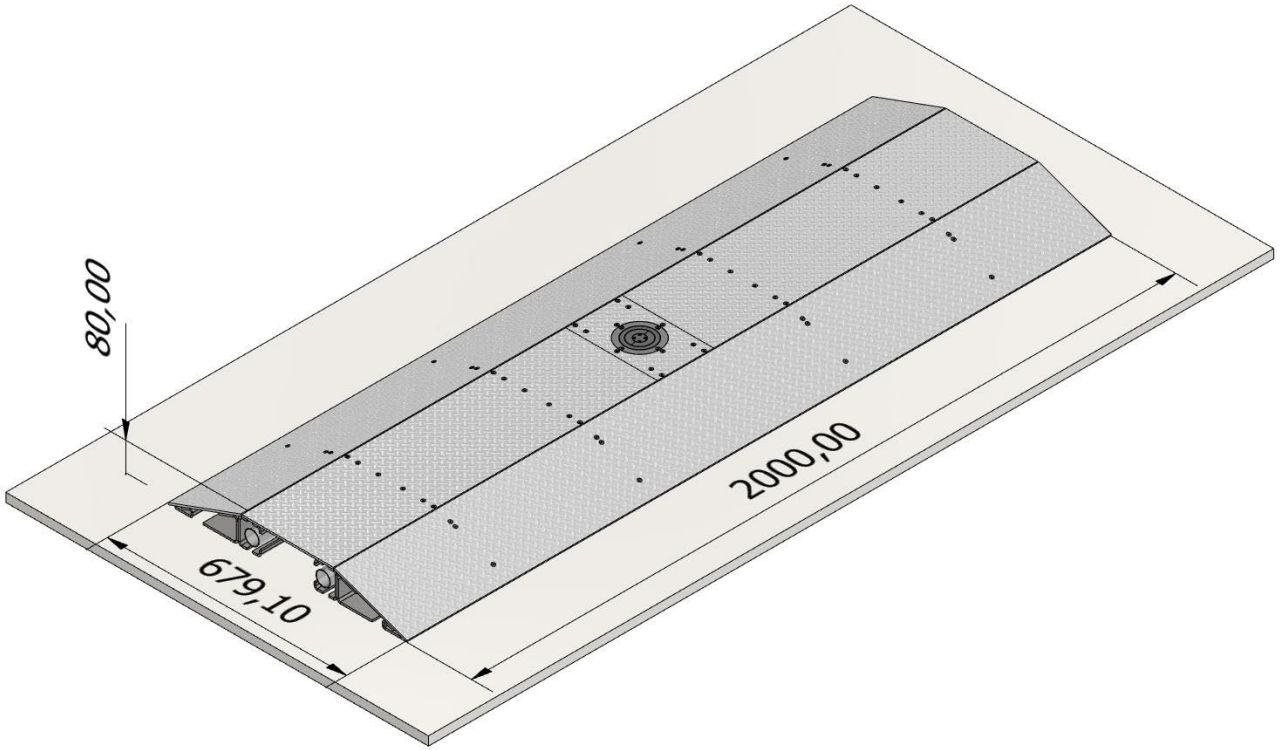


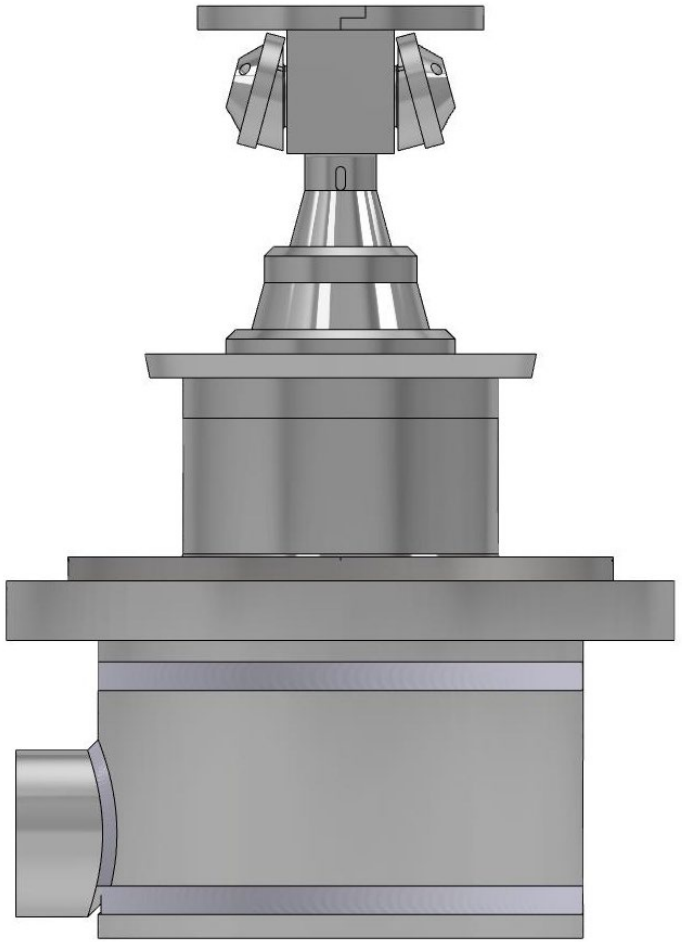
Section Model F102-1 – Ref. dwg. no 210310-5200



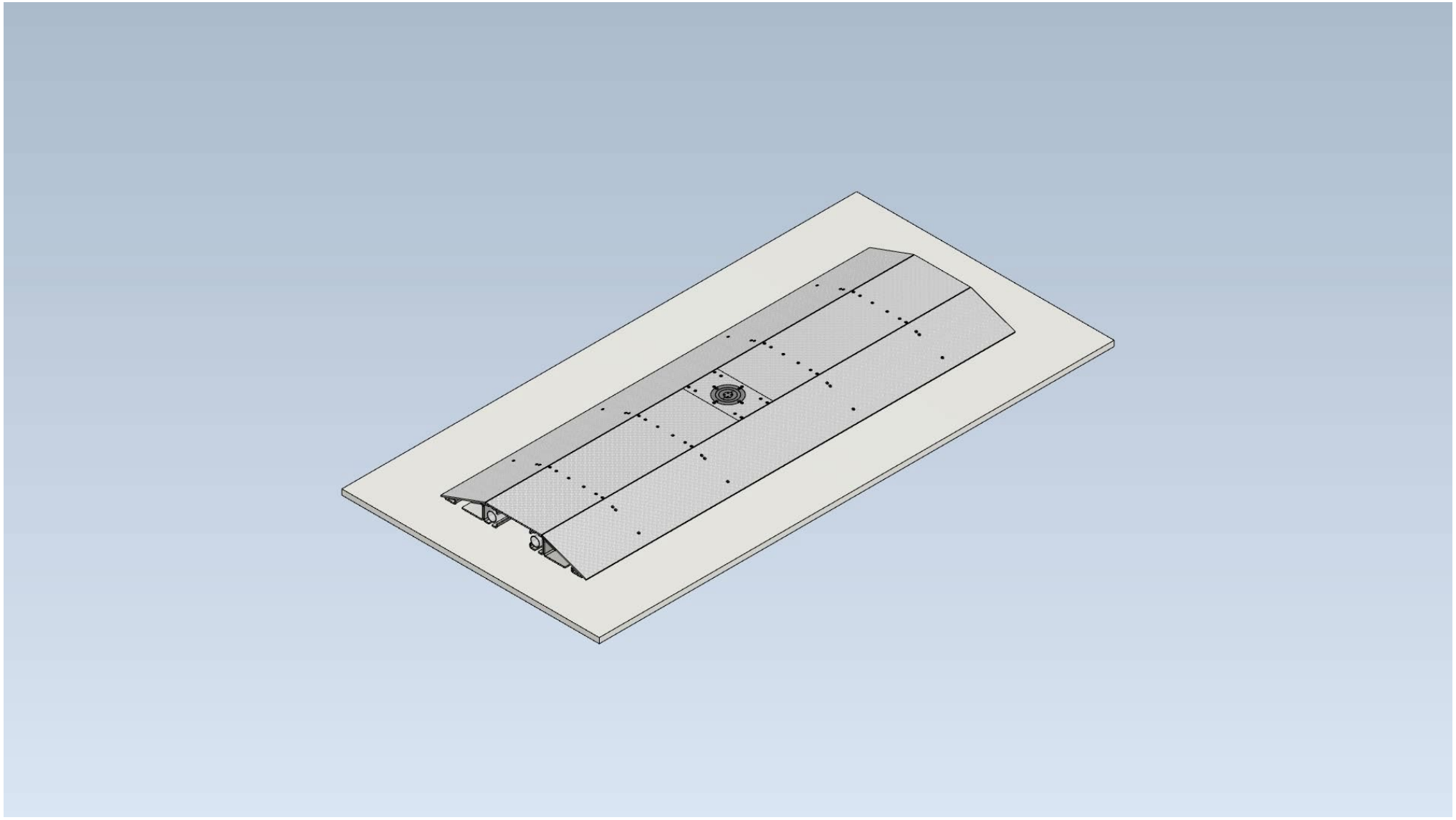
F-102 nozzles installed in the floor

Retrofit nozzles installed on the floor

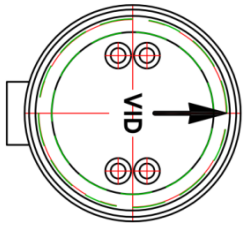




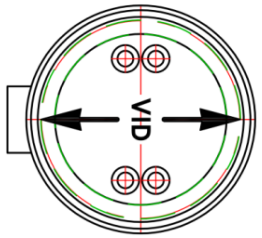
Retrofit nozzles installed on the floor



Hydraulic parameters



Spray direction F 102-1

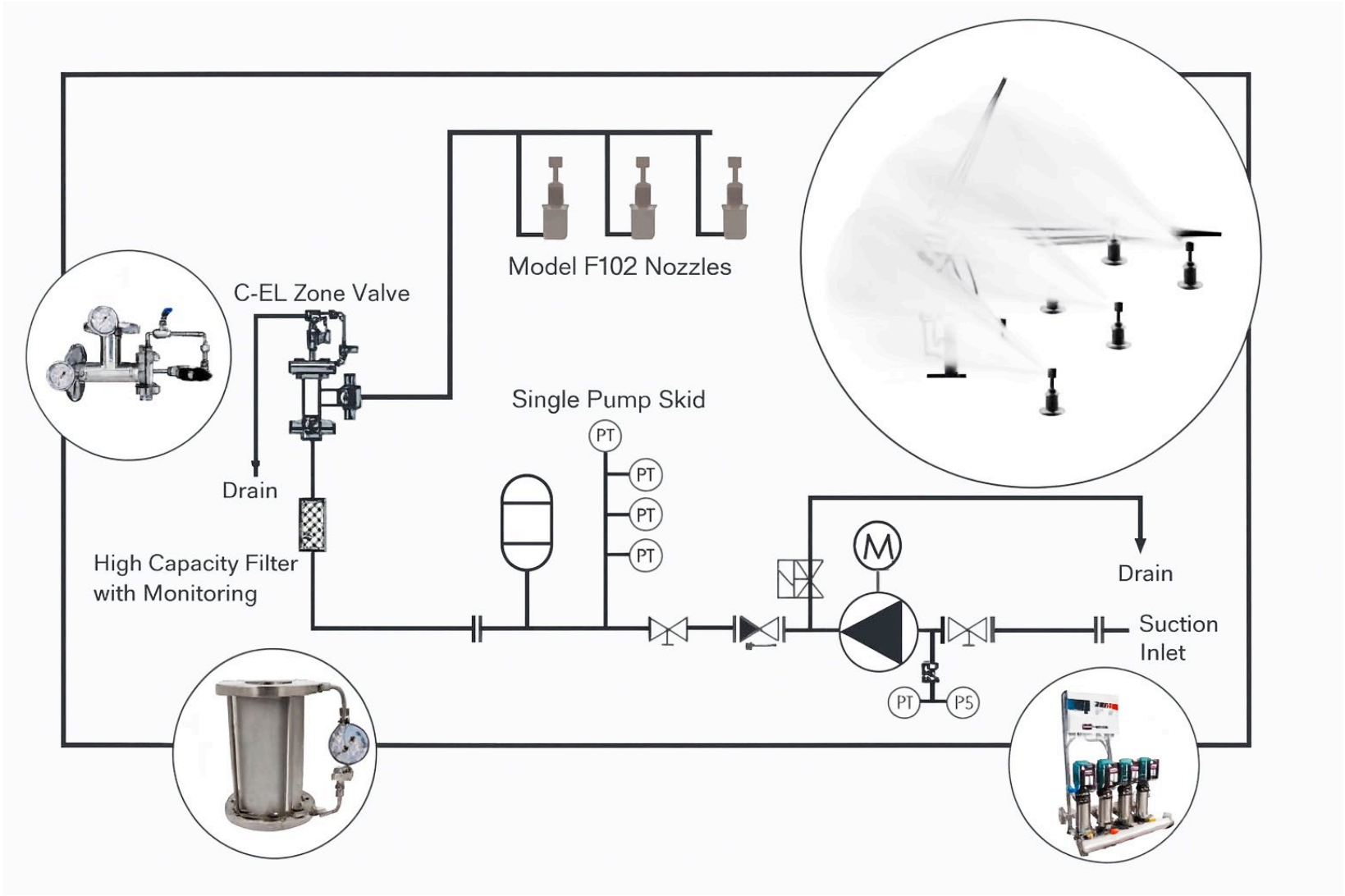


Spray direction F 102-2

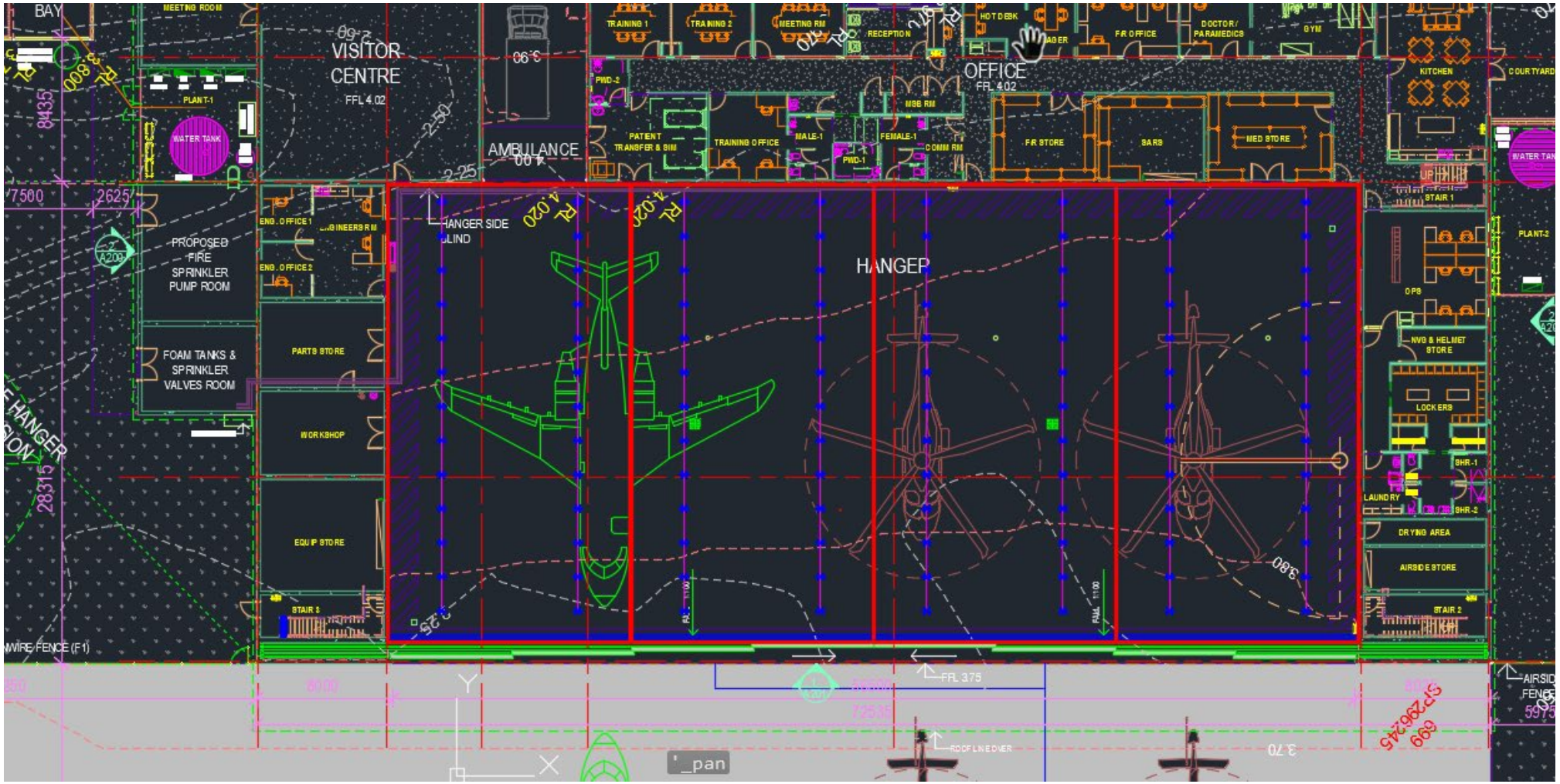
TYPE	POP-UP / CONCEALED NOZZLE
Materials:	House & Cover: Stainless Steel 304 Nozzle body: Brass+NiPTFE Strainer & Spring: AISI 316
Water Pressure:	10 bar – 16 bar
K-factor:	12.0 (l/min/√bar)
Nominal Flow-rate:	37.9 l/min @10 Bar
Maximum Spacing:	2.0 m x 4.0 m
Nominal density:	4.00 l/min/m²
Maximum Ceiling Height:	Unlimited
Connection/Thread:	¾” BSPT Female

TYPE	POP-UP / CONCEALED NOZZLE
Materials:	House & Cover: Stainless Steel 303 Nozzle body: Brass+NiPTFE Strainer & Spring: AISI 316
Water Pressure:	10 bar – 16 bar
K-factor:	24.0 (l/min/√bar)
Nominal Flow-rate:	75.8 l/min @10 Bar
Maximum Spacing:	2.0 m x 4.0 m each side
Nominal density:	4.00 l/min/m²
Maximum Ceiling Height:	Unlimited
Connection/Thread:	¾” BSPT Female

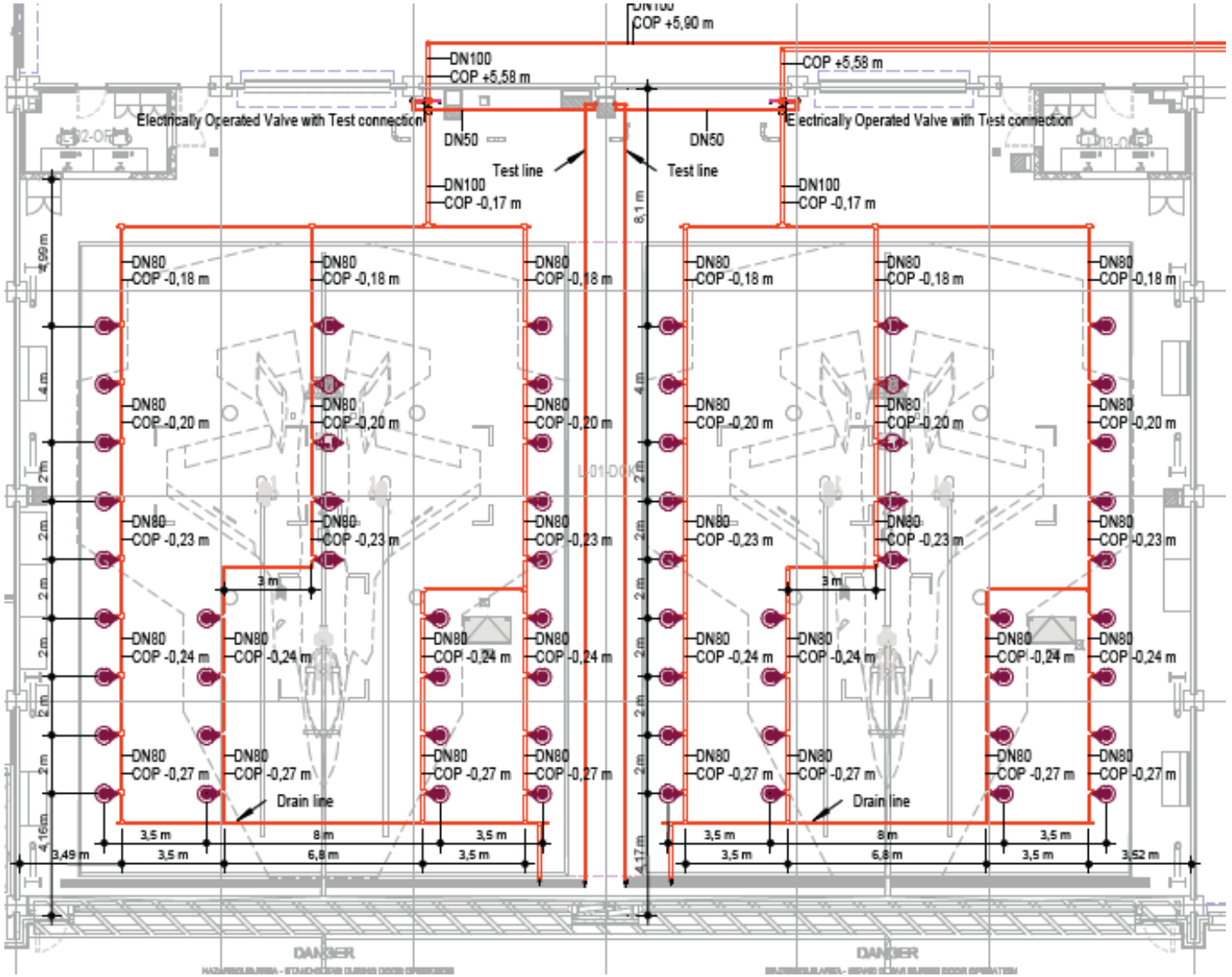
System layout aircraft hangar water mist protection



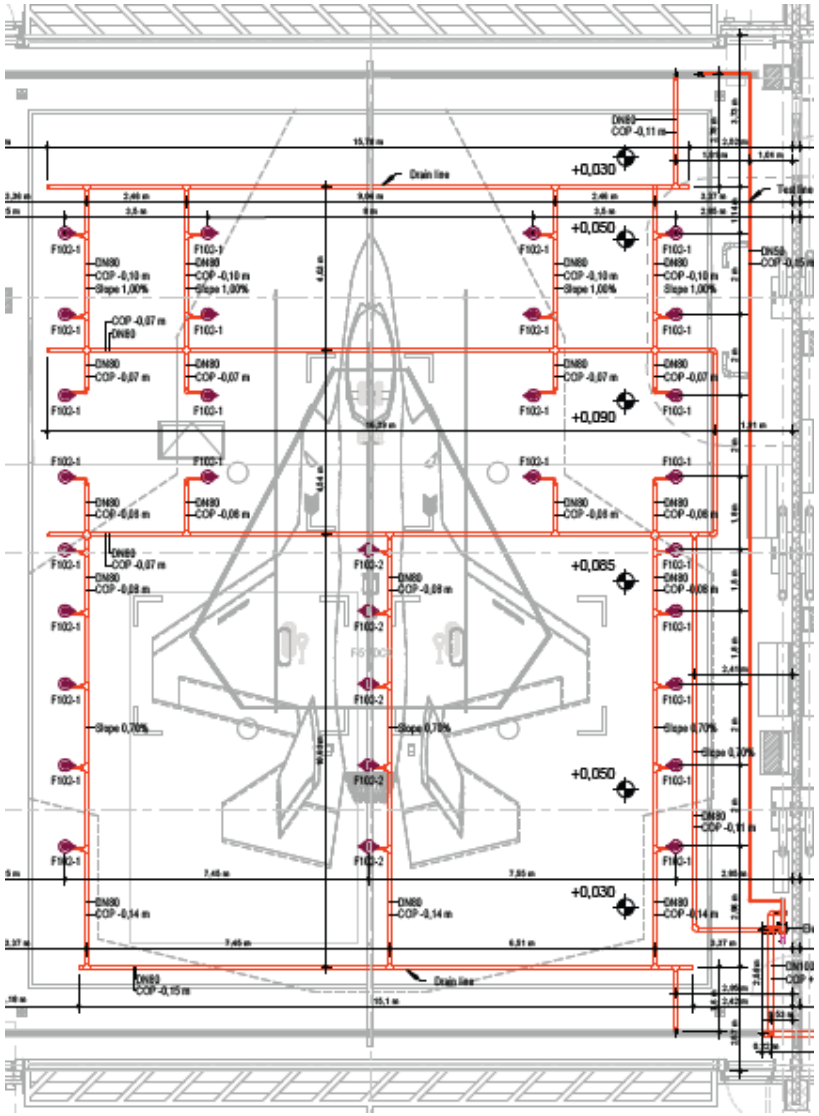
System layout aircraft hangar water mist protection

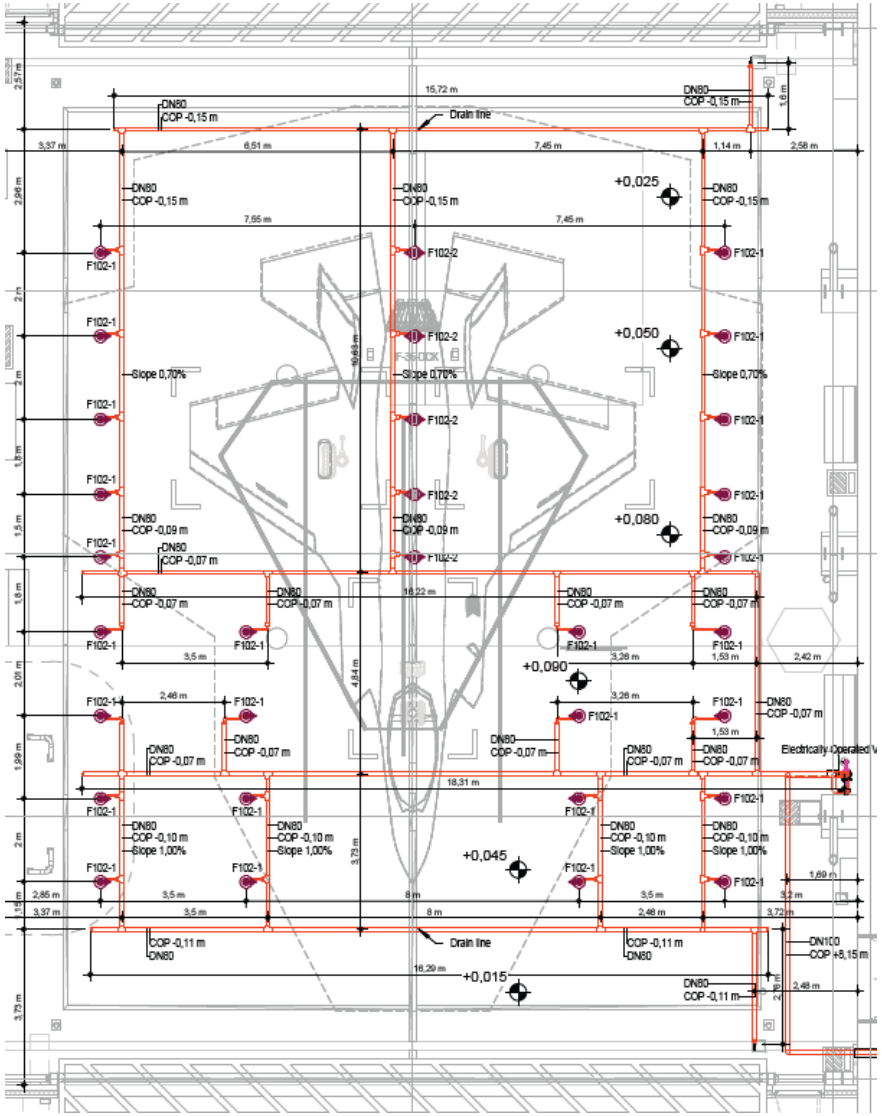


System layout aircraft hangar water mist protection



System layout aircraft hangar water mist protection





Case study F16,F35, Helicopter and AWACs hangars

VID FIREKILL®
LOW PRESSURE WATERMIST

ØRLAND FLYSTASJON Norway

Project specifications:

Type of hangar: Multiple

Type solution: Popup nozzles and F202 retrofit

Structure protection: K6 machinery space nozzle

Installation year: 2003/2004

F16 fighter jet hangars

ØRLAND FLYSTASJON Norway

Project specifications:

Type of hangar: Multiple

Type solution: Popup nozzles and F202 retrofit

Structure protection: K6 machinery space nozzle

Installation year: 2003/2004

AWACS hangar

ØRLAND FLYSTASJON Norway

Project specifications:

Type of hangar: Multiple

Type solution: popup nozzle

Structure protection: none

Installation year: 2003

F16 and other planes

ØRLAND FLYSTASJON Norway

Project specifications:

Type of hangar: Multiple

Type solution: popup nozzle

Structure protection: K6 machinery space nozzle

Installation year: 2016

F35 fighter jet hangars

Haakonsvern Norway

Project specifications:

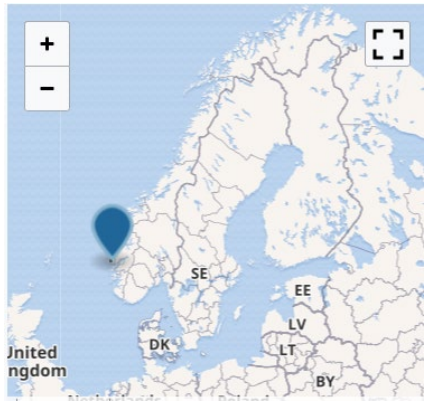
Type of hangar: Multiple

Type solution: popup nozzle F102

Structure protection: K6 for structure protection

Installation year: 2015

Helikopter hangars



Police SWAT Team Oslo - Norway

Project specifications:

Type of hangar: Double and single

Type solution: popup nozzle

Structure protection: K6 machinery space nozzle

Installation year: 2019

POLITIET

Helikopter hangars

F35 fighter jet hangars Florennes Air Base - Belgium

Project specifications:

Type of hangar: 18 Single and 4 double

Type solution: popup nozzle

Structure protection: No

Installation year: 2023

F35 fighter jet hangars Kleine Brogel Air Base Belgium

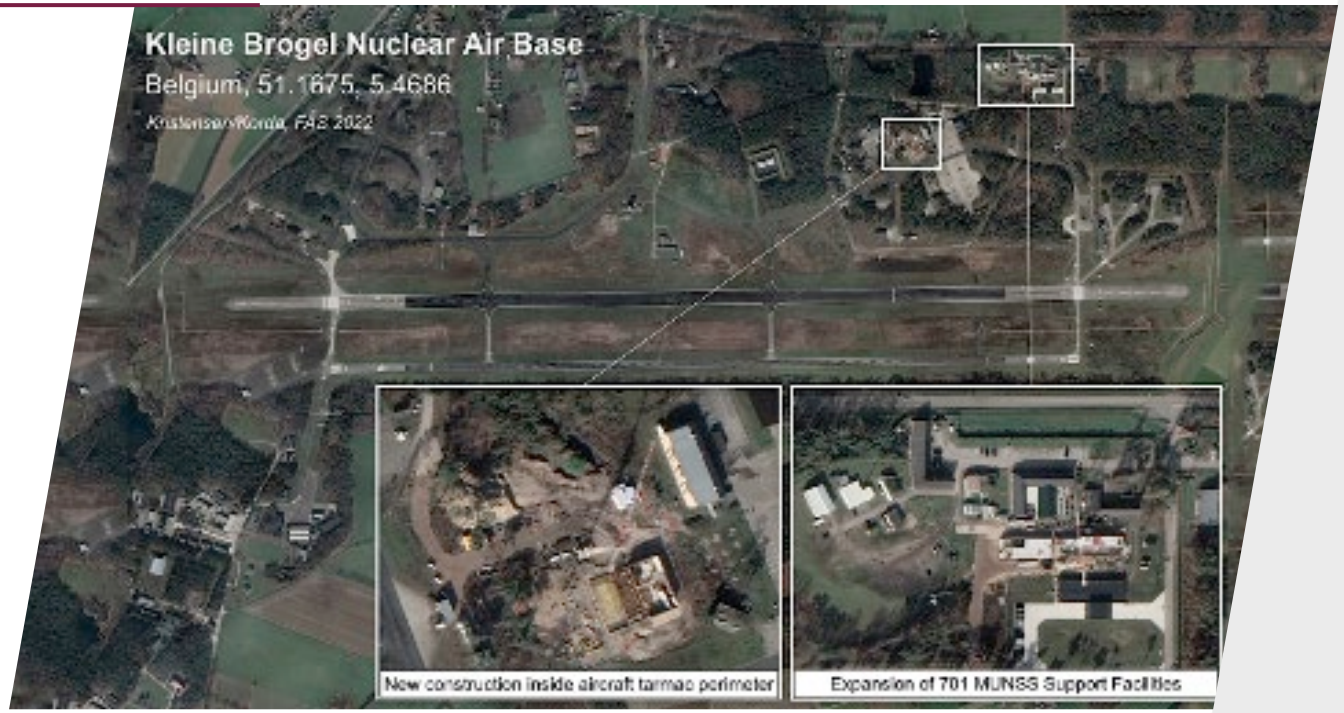
Project specifications:

Type of hangar: 18 Single and 4 double

Type solution: popup nozzle

Structure protection: No

Installation year: 2025



KLEINE-BROGEL AIR BASE

Thank you

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