FIREWORKS

Fire Protection Systems

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Fire Protection Systems

Integration of Water Mist Systems into Data Centre Protection

Presented by Lee Haines
Sales Director Fireworks Fire Protection Ltd

2025 IWMC
International Water Mist Conference

Contents

Solution

FIREWORKS Fire Protection Systems

30 YEARS+ OF WATER MIST EXCELLENCE

Water Mist system have been tested and certified to *FM Standards* for Hazard Categories found in Data Centre Facilities.

FM Approvals

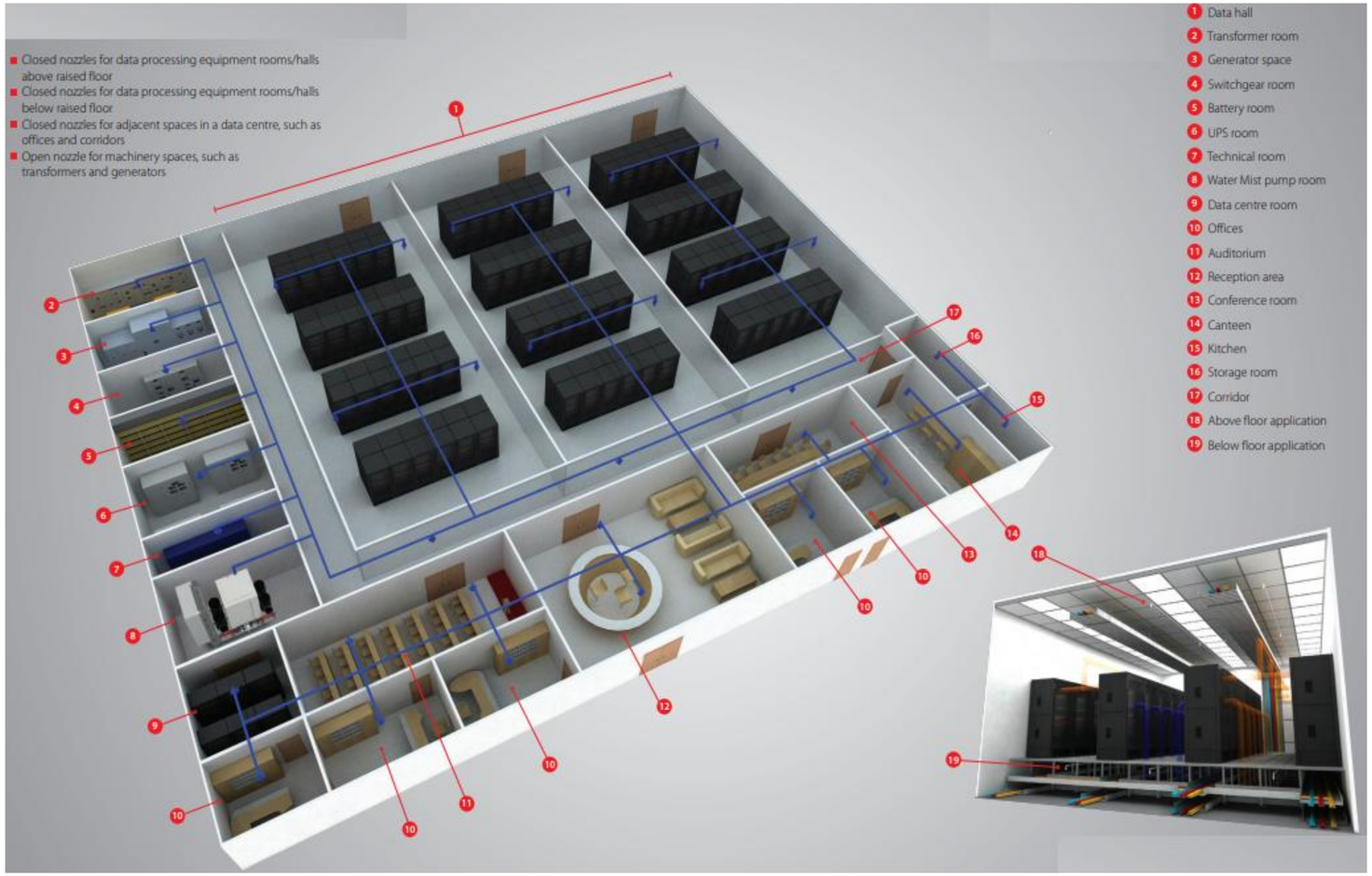
APPENDIX E: FIRE TESTS FOR WATER MIST SYSTEMS FOR THE PROTECTION OF MACHINERY IN ENCLOSURES WITH VOLUMES EXCEEDING 9175 FT^3 (260 M^3)

APPENDIX G: FIRE TESTS FOR WATER MIST SYSTEMS FOR THE PROTECTION OF NON-STORAGE OCCUPANCIES, HAZARD CATEGORY 1 (HC-1) [FORMERLY LIGHT HAZARD OCCUPANCIES]

APPENDIX M: FIRE TESTS FOR WATER MIST SYSTEMS FOR THE PROTECTION OF DATA PROCESSING EQUIPMENT ROOMS/HALLS – ABOVE RAISED FLOOR

APPENDIX N: FIRE TESTS FOR WATER MIST SYSTEMS FOR THE PROTECTION OF DATA PROCESSING EQUIPMENT ROOMS/HALLS – BELOW RAISED FLOOR

APPENDIX P: FIRE TESTS FOR WATER MIST SYSTEMS FOR THE PROTECTION OF NON-STORAGE OCCUPANCIES, HAZARD CATEGORY 2 (HC-2) AND HAZARD CATEGORY 3 (HC-3)



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Certification & DIOM

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Following successful fire testing a Certification of Compliance is issued which also certifies the *Original Equipment Manufactures* (OEM), *Design, Installation, Operation and Maintenance* (DIOM) Manual.

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Water Mist System

System Designation:	SEM-SAFE® Water Mist Systems for the Protection of Data Processing Equipment Rooms/Halls
Design, Installation, Operation and Maintenance Manual:	SEM-SAFE® Water Mist Fire Fighting Systems for Protection of Data Processing Equipment Room/Halls Design, Installation, Operation, and Maintenance Manual, Document ID: 46-0001-511-04, Revision: 4, Date of Issue: June 2018

Prepared for:

Manufactured at:

FM Approvals

Member of the FM Global Group

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Water Mist System

System Designation:	FIREKILL™ Low Pressure Water Mist System for the Protection of Data Processing Equipment Rooms/Halls - Above and Below Raised Floor
Design, Installation, Operation and Maintenance Manual:	FIREKILL™ Low Pressure Water Mist System for Protection of Data Processing Equipment Rooms/Halls Above and Below Raised Floors Design, Installation, Operation, and Maintenance (DIOM) Manual, Document ID: 180209-01-16, Revision: 06, Date of Issue: 23-04-2019

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 Standard Class: 5560 - April 2016

Approval Identification: PR448914 Approval Granted: May 30, 2019

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 strict conformity to the 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

FM Approvals

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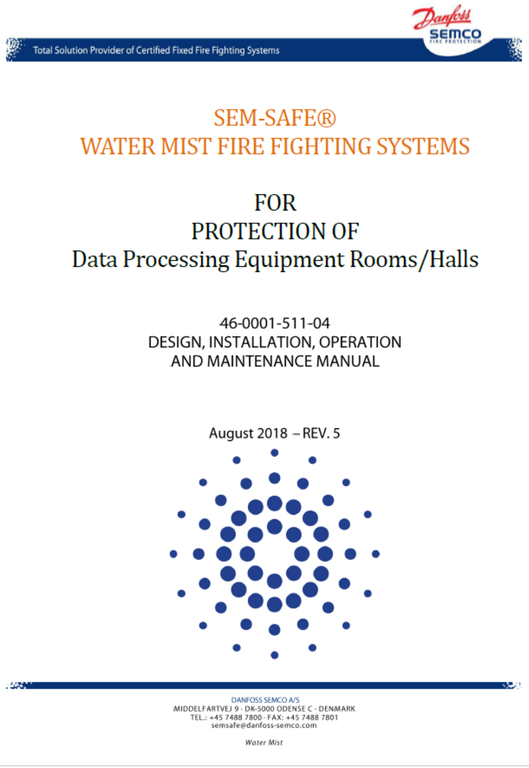

Danfoss semco

Total Solution Provider of Certified Fixed Fire Fighting Systems

SEM-SAFE®
WATER MIST FIRE FIGHTING SYSTEMS

FOR
PROTECTION OF
Data Processing Equipment Rooms/Halls

46-0001-511-04
DESIGN, INSTALLATION, OPERATION
AND MAINTENANCE MANUAL

August 2018 – REV. 5

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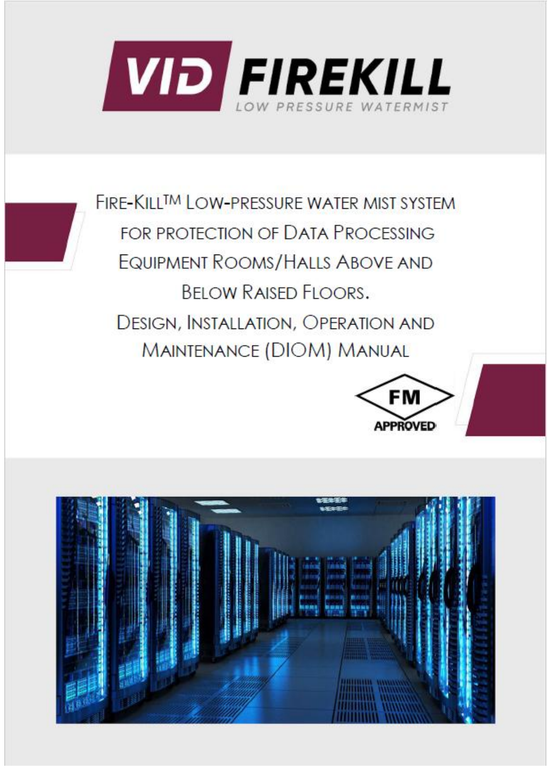
Water Mist



VID FIREKILL
LOW PRESSURE WATERMIST

FIRE-KILL™ LOW-PRESSURE WATER MIST SYSTEM FOR PROTECTION OF DATA PROCESSING EQUIPMENT ROOMS/HALLS ABOVE AND BELOW RAISED FLOORS.
DESIGN, INSTALLATION, OPERATION AND MAINTENANCE (DIOM) MANUAL

FM APPROVED

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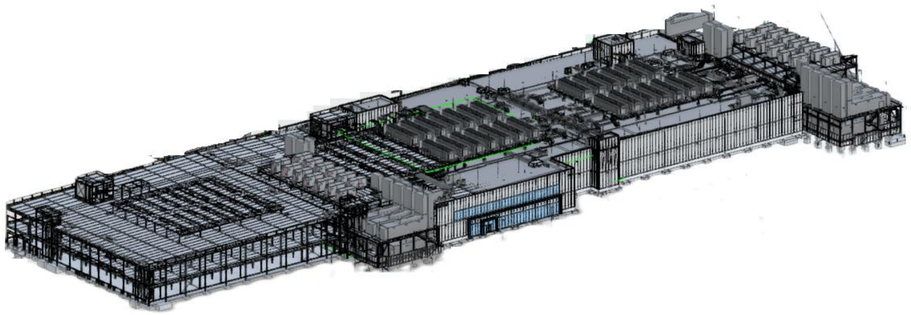
Design

Conducted in Building Information Modelling (BIM) in accordance with ISO 19650

BS EN ISO 19650-1:2018

Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling



Design

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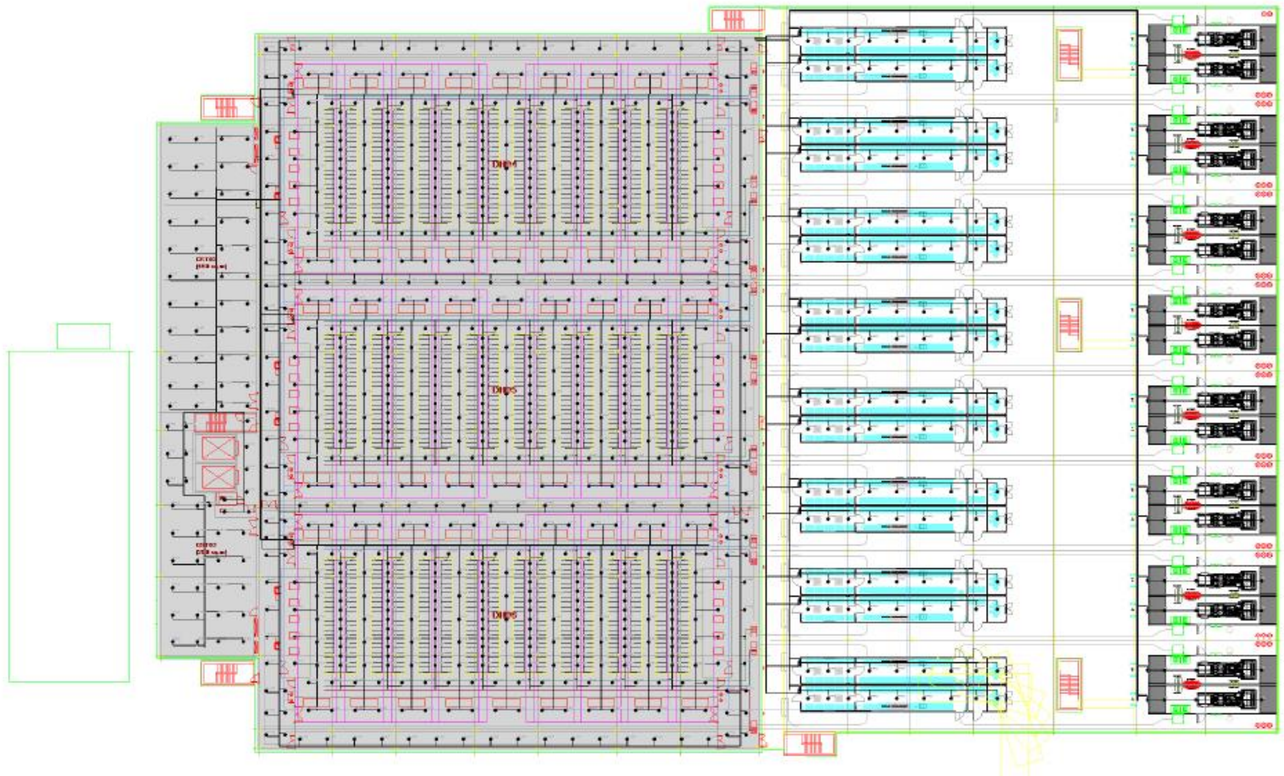
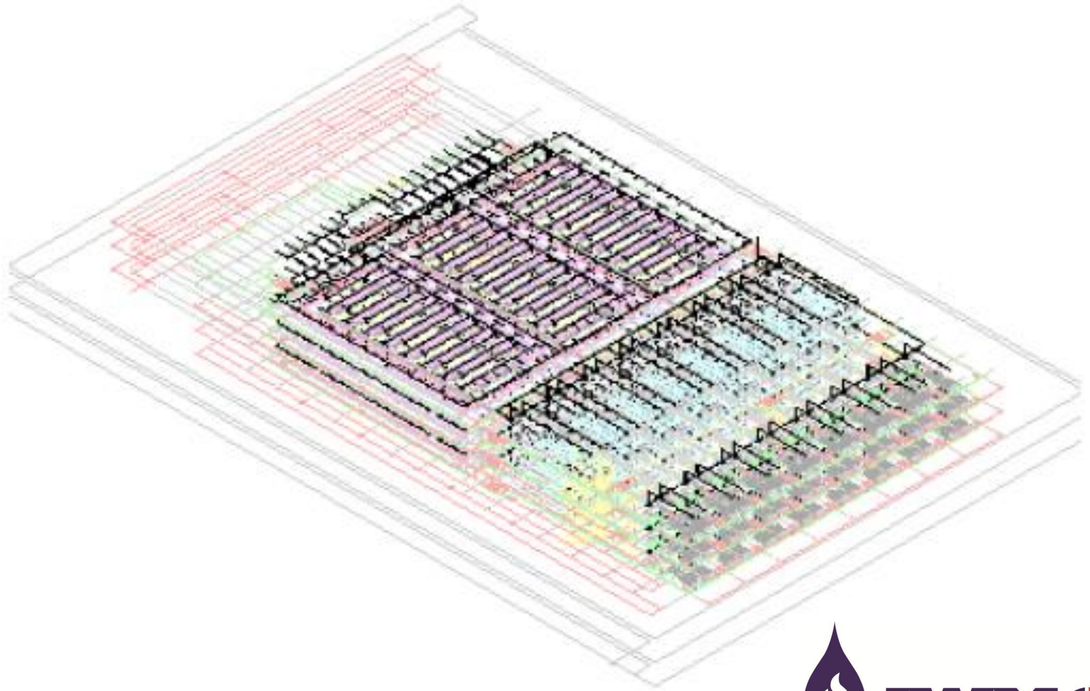
Once compete the model provides digital representation of the building including - architectural, structural, mechanical, electrical, and plumbing services.

Fully coordinated BIM models improve design accuracy, streamline workflows, and enhance decision-making throughout the project lifecycle.





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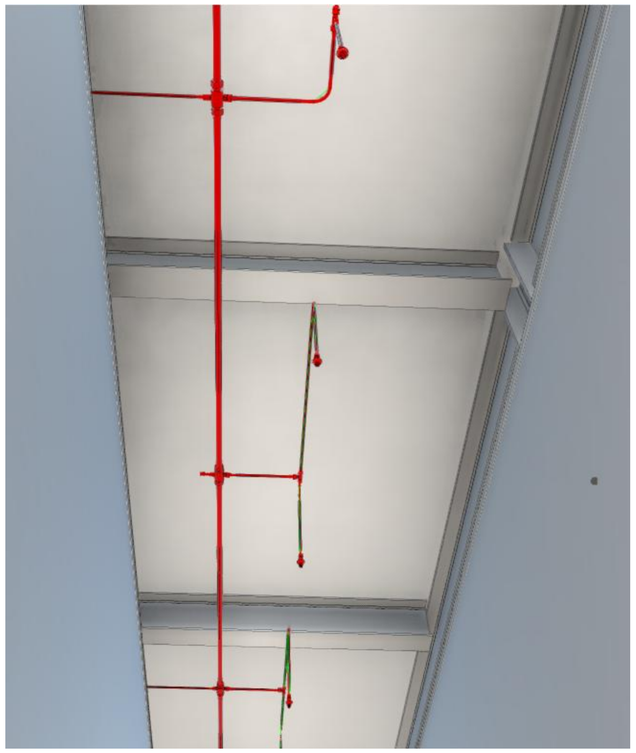
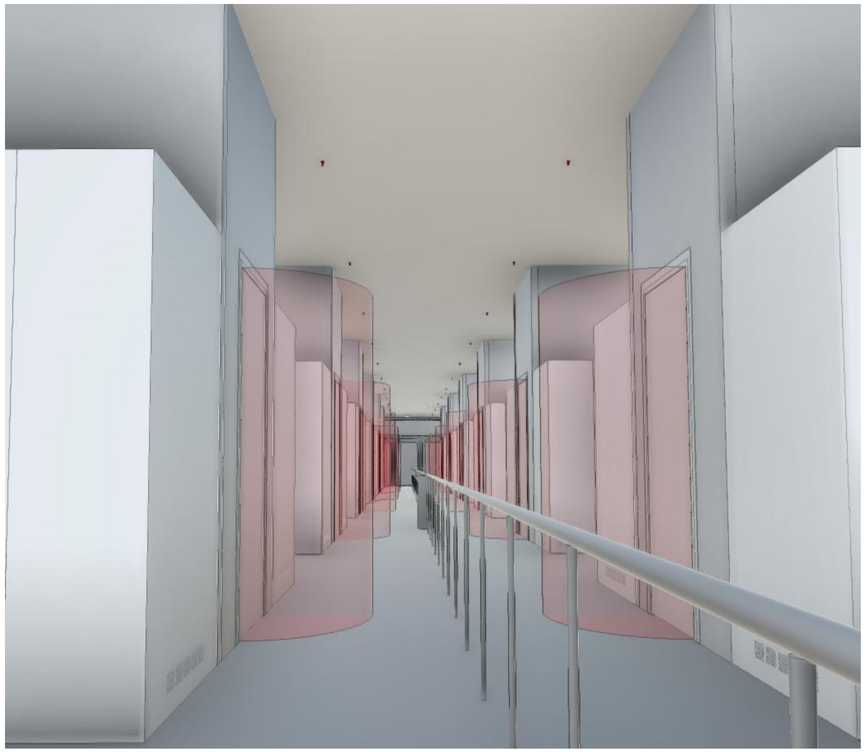
Design

Network of pipework and nozzles positioned across the building taking into consideration hazard classification and obstructions





Design

Full hydraulic calculations are undertaken identifying the hydraulic most favorable and unfavorable areas in the building.

Hydraulic Calculations Summary

for

Project Name: 1
Location:
Drawing Name: MOR-6000-ZZ-ZZ-M3-M-40001 Calculation Date:9/24/2024

Design
Remote Area Name: 09 AMAO

Occupancy Classification: Ordinary Hazard Group 1

Density 0.2 L/min/m²

Area of Application: 72.00 m²
Coverage per Sprinkler: 9.29 m² (typical)
Type of Sprinklers Calculated:
No. of Sprinklers Calculated: 8

Type of System: N/A Volume of Dry or PreAction System: N/A
In-rack Demand: N/A at Node: N/A
Hose Streams: 0.0 L/min at Node: 1 Type Allowance at Source

Total Water Required (including Hose Streams where applicable)
FROM: Water Supply at Node 1: 288.7 L/min @ 120.7 bar
Safety Margin: -121.3 bar

Applied Friction Loss Method: Darcy
Darcy-Weisbach Suppression Agent: Water (68 °C)

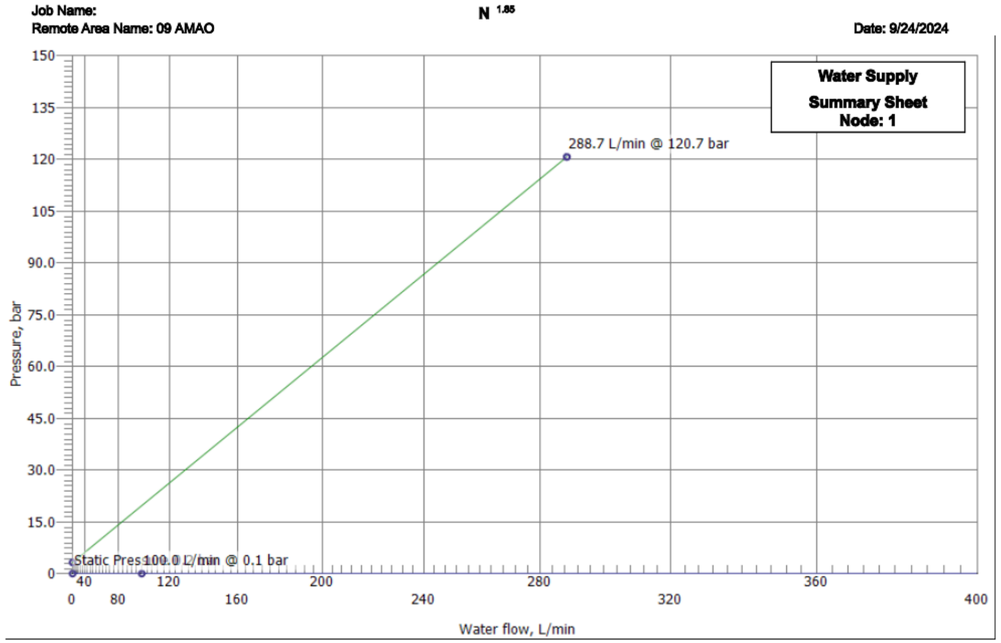
Contact Name
Address:
Phone Number: Name of Designer: Fireworks Fire Protection Ltd

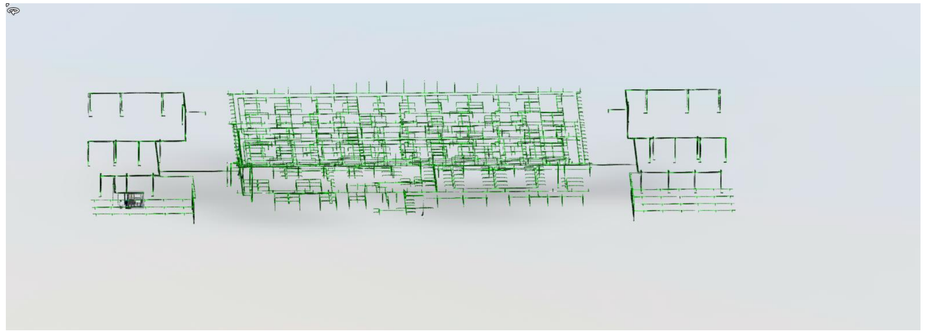
Authority Having Jurisdiction:

Notes:

Automatic Peaking Results

Hydraulic Graph





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“White Space”

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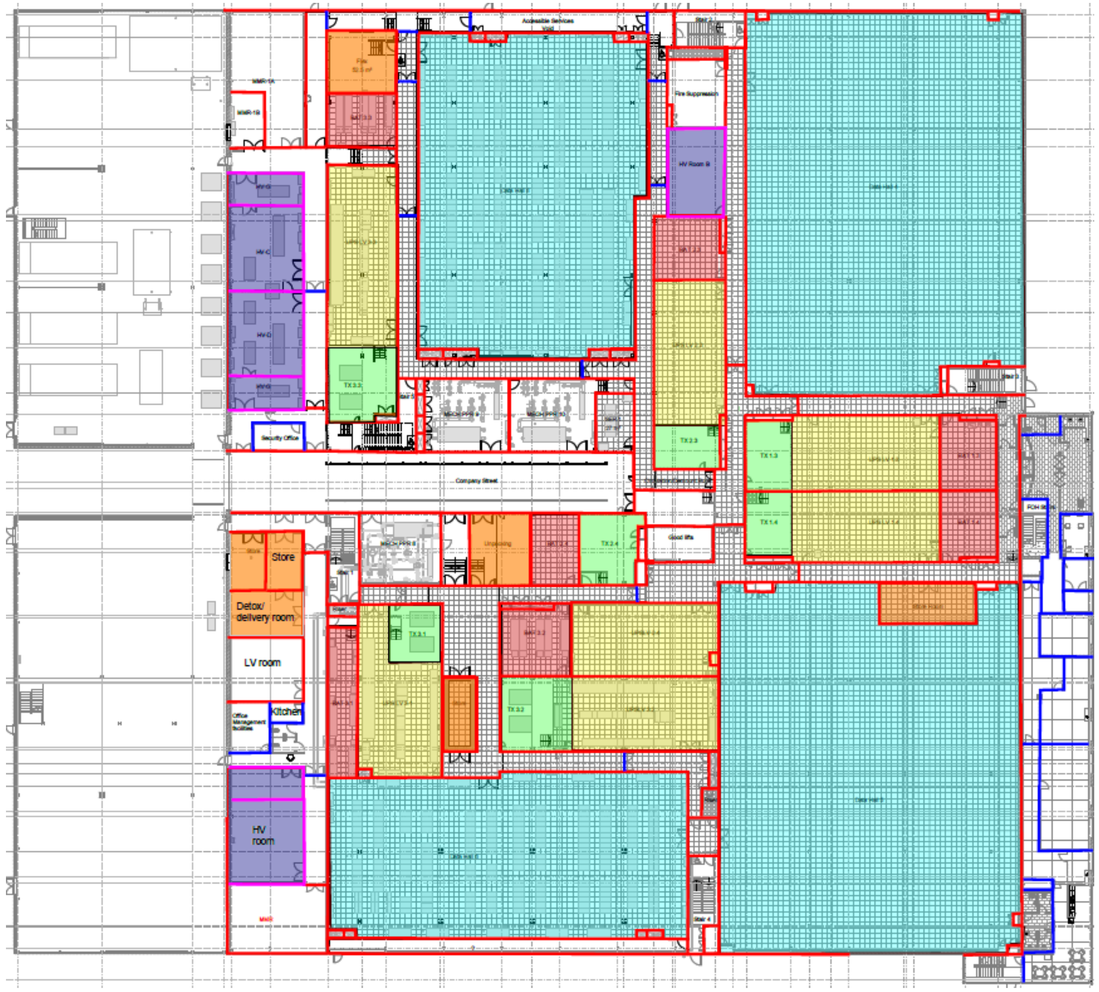

Some data centres initially install fire suppression nozzles in the general “White Space” area before the final layout of the Data Hall is confirmed.

Once the layout is finalised, the fit-out process ensures that these nozzles are repositioned or adjusted to align precisely with the Design, Installation, Operation, and Maintenance (DIOM) documentation.

This approach allows flexibility during early construction stages but requires careful coordination later to meet safety and compliance standards.

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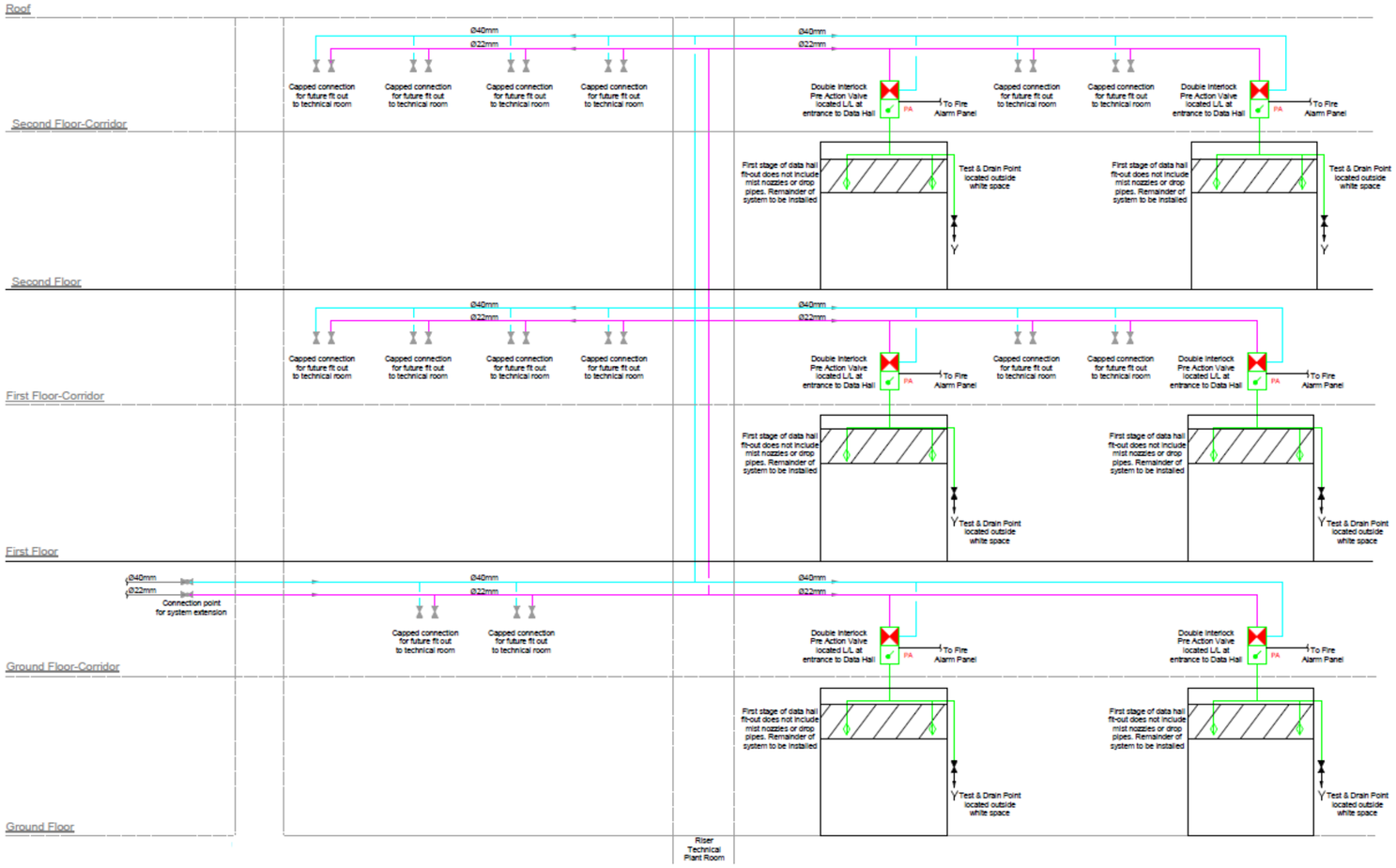
Phasing



Many DC are large and will be designed in Phases.

Core Equipment is sized for all Phases of the project and installed in Phase 1

Capped connections are left for further phases

Installation in phases brings many challenge whilst working in alive DC.

Installation

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Once the designs have been verified and signed off, we now turn the BIM model in to reality!

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Installation

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Installation

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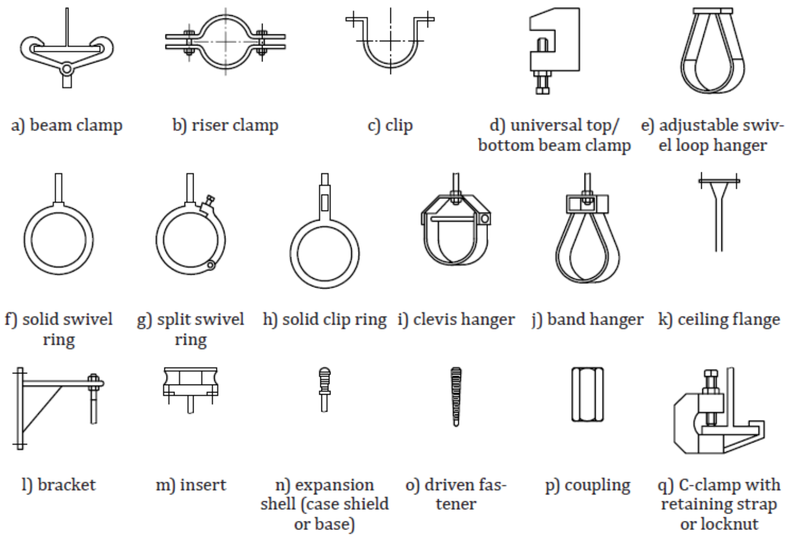
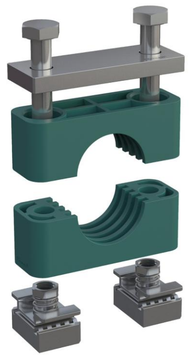
Pipe Supports in accordance with ISO 61282-11



Nominal diameter mm	Horizontal run m	Vertical run m
12	1,2	1,8
16	1,5	2,1
22	1,8	2,4
25	1,8	2,4
30	2,4	3,0
38	2,4	3,0
42	2,4	3,0
54	2,7	3,0



Pipe Supports shall be spaced according to the OEM DIOM, though no greater than those shown above.

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Installation

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Stainless Steel Fittings

Straight

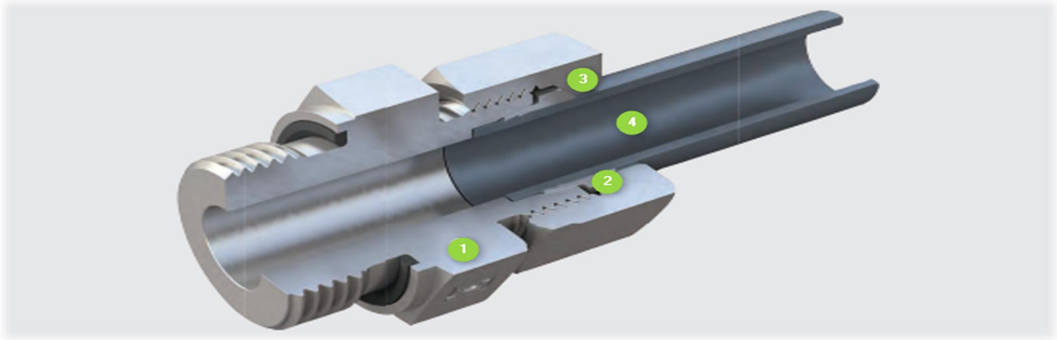
Elbow

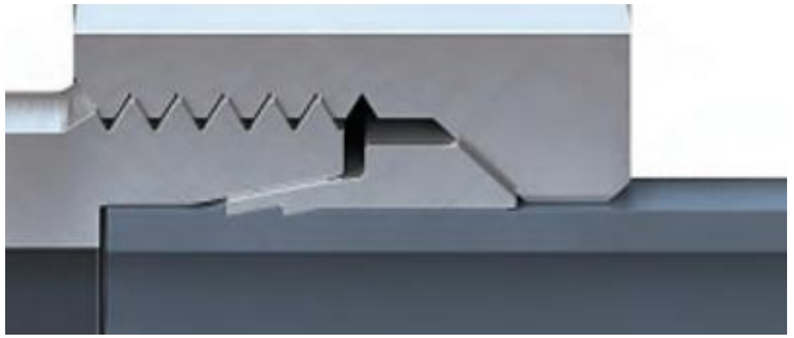
Tee Fipe

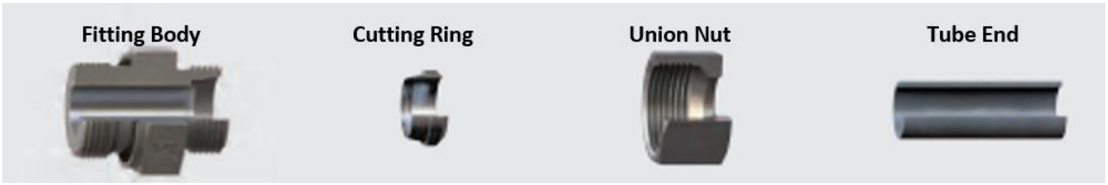
Blind reducer

Cross reducer

Section value







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Commissioning

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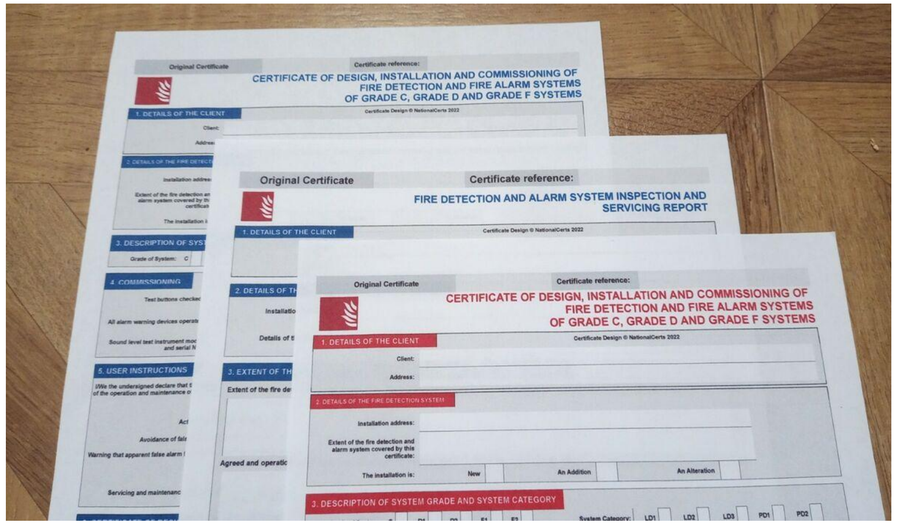
Verification – Pumps, nozzles, valves, pipework and control panel are installed to specification

Function Test – Pressure Test, flow rate checks, and activation trials

Integration – Ensuring fire detection, alarms and BSM connections

Documentation – Completion Certificate, Pressure Test Certificate, As Built Drawings, Operation and Maintenance Manual.



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