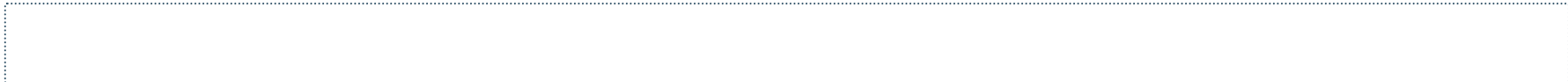


Presentation of Novenco



Application Areas

- Land:
 - Office buildings, schools and universities
 - Hospitals, churches
 - Shopping mall
 - Nursing homes
 - Industrial buildings
- Marine:
 - Offshore
 - Navy
 - Cargo vessels
 - Yachts
 - Ferries etc.

Previous Novenco Land projects



■ Sea west 10000m²



■ SEB bank 36000m²



■ Hospital 3000m²



■ Mikado house 32000m²



■ Office Building 29000m²



■ Shopping Centre 5000m²

■ Since 2005 Novenco land projects have increased in popularity and in application from office buildings to hospitals in Denmark, UK, Italy, Norway, Iceland and Finland

FIRE FIGHTING

Why is Water Mist popular?

- Recognised by local authorities
- Environmentally friendly
- Reduces Fire and Water damage
- Time and cost efficient
 - Low installation and maintenance costs due to press fitting and few nozzles
- Saves space
 - Smaller dimension of pipes
 - Leaves space for other ceiling installations such as ventilation and cables.
 - Smaller sprinkler rooms- smaller pump units
- Requires less water
 - Smaller water tank
- Aesthetically appealing
 - Concealed nozzle
 - Protective nozzle cover of any colour to match ceiling

Folie 4

MRK2

Dtek is one of the installation companies that Novenco have used in the recent projects shown before. Dtek is one of the leading installation companies in Denmark and here to talk more about it and the Novenco system is Anders Sindal who is the owner of Dteka and is also a chairman of Danish Sprinkler section.

Marie Karlsson; 07.09.2009

Anders Sindal Kristensen



Dansk Teknikentreprise A/S

- Owner of Dtek
- Chairman of Danish Sprinkler section
- Sprinkler certified engineer

Dtek- Danish Technical Enterprise



- Established in 2001 .
- DTEK A/S employs about 150 people located in Copenhagen, Århus, Aalborg and Støvring.
- DTEK A/S is a accredited and certified under DS/EN ISO 9001:2000.
- DTEK A/S has experience in mechanical and sprinkler installation.
- DTEK has co-operated with Novenco on several project in 2007 ranging from nursing homes to office buildings one of the projects underway is Mikado house.

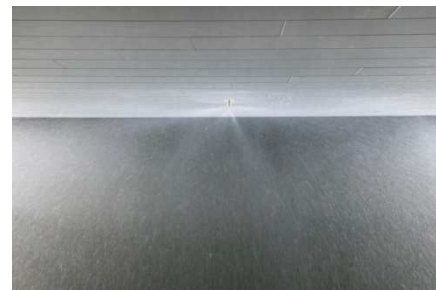
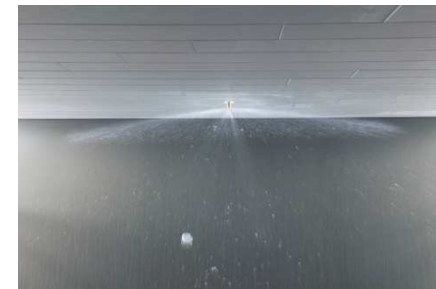


Dansk Teknikentreprise A/S

Advantages of the Novenco Xflow ®System



- Simple Reliable system
- Low system cost (Pipe, sprinklerroom)
- Time efficient installation
- Larger area of nozzle coverage
- Smaller pipe dimensions
- Standard components
- Saves up to 50% of water usage-
 - F.ex.1600l/min conventional vs. 700l/min Novenco water mist system
- Press fitting- Easier maintenance
- Architecturally appealing – concealed sprinkler



Covers – Architecturally appealing solution



- The nozzle is covered by a cover to avoid damage or unintended release.
- The cover is available in several colors.
- A visually appealing solution in which the nozzle is integrated in the ceiling.



Folie 8

MRK5

As you can see water mist is the optimal choice and Dtek have therefore decided to move forward in installing it in the mikado project. before installatin can commence Dtek must first seek approval from local authories and DBI. the procedure- next slide

Marie Karlsson; 07.09.2009

XFlow® Nozzles



- NHP18A, spacing 5x5m

Water consumption per nozzle: 40 l/min.
at 4 bar, $K=20$

- NHP2, spacing 2x2m

Water consumption per nozzle: 5 l/min at
7 bar, $K= 1,9$

- NHP4, spacing 3x3m

Water consumption per nozzle: 12.93
l/min at 7,7 bar, $K= 4,66$

- NHP9

Water consumption per nozzle: 27 l/min
at 9 bar, $K= 9$



Sprinkler versus Water Mist



	Conventional Sprinkler System	Water Mist System
Pressure at Nozzle	0.5 bar	4 bar
Way of extinguination	Cooling	Cooling and Oxygen suffocation
System configuration	Difficult	Simple
Price	Low	Low
Water consumption	5 l/min/m ²	1.6l /min/m ²
Pipe size	Large	Small
Recommended Pipe material	Steel	Stainless steel, Galvanized coated pipes
Working Pressure	< 10 bar	<16 bar
Fitting	Sprinklerfitting	Pressfitting
Max. Areal coverage pr. sprinkler	12m ²	25m ²
Installation time pr. m²	6,6 minutes/m ²	3,25 minutes/m ²

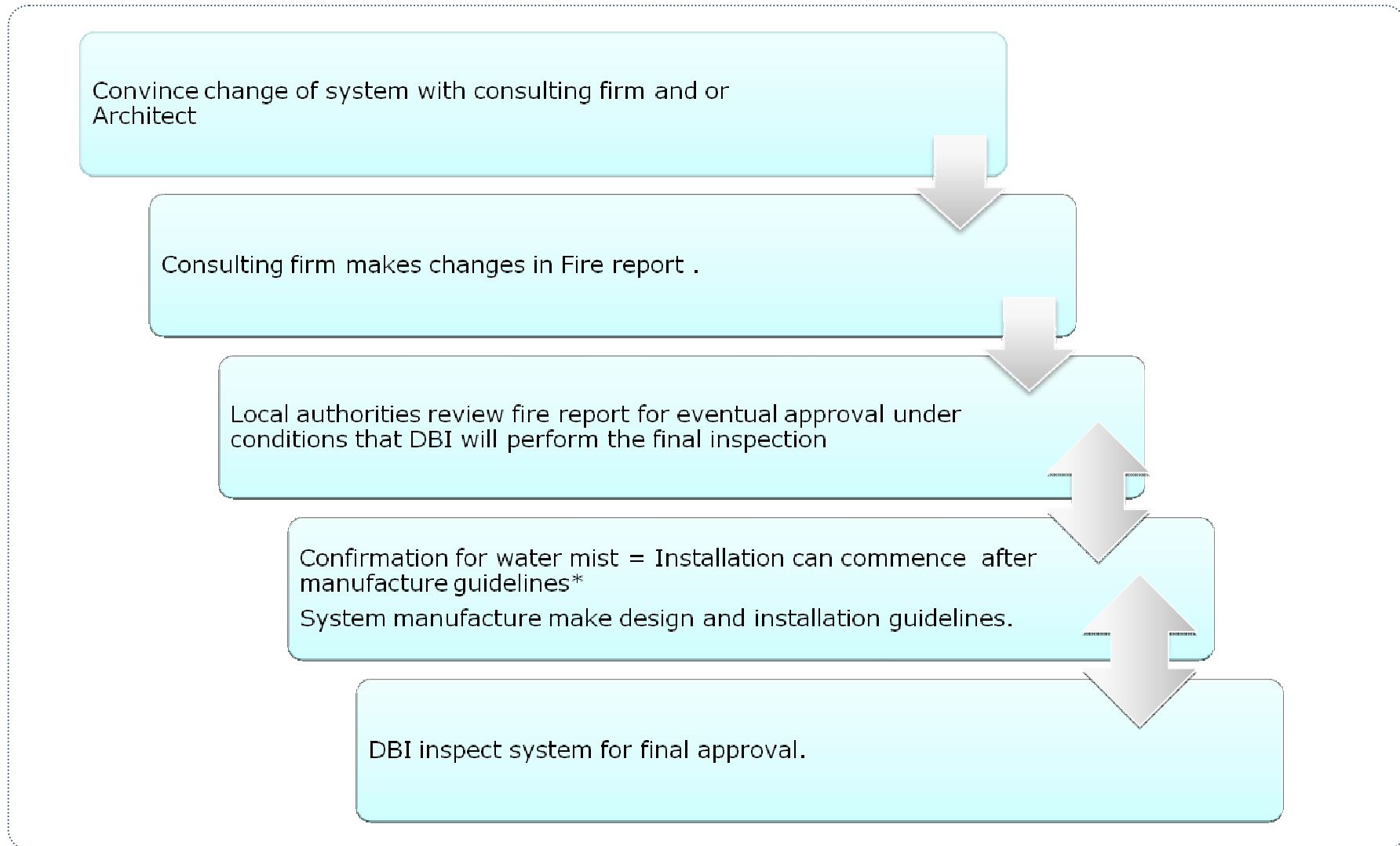
Project : Mikado House



- Located in Ørestad, Copenhagen
- 32000m²
- 6- storey Office building with atrium.
- Novenco Water Mist system installed by Dtek.

FIRE FIGHTING

Procedure



MRK6

Fitting of the Water mist system has to undergo the following procedure

1. Contact architect and or consulting firm in order to convince them that the water mist system is in the best interest of the building/project
2. When the firm is convinced they make changes in the fire report- the fire report is a detailed fire analysis of the building- includes: technical drawing of the building, Escape routes, fire simulations and tests etc.
3. When the fire report is done, it is sent to the local authorities for approval under the condition that when installed, it will undergo DBI final inspection. This is an ongoing process and changes can be made until an approval is acquired.
4. When approval of fire report is acquired the installation can commence. Installation must be implemented under certain specifications. These specifications are given by the watermist manufacturer. The specification contains datasheets, instruction manuals and installation guidelines of the system.
5. When installation is complete, DBI inspects the system for approval. The system MUST follow Danish standard approvals and guidelines.

Marie Karlsson; 07.09.2009

Installation of system



- System must be approved for Inspection by:
 - DBI
 - Local authorities
- System must fulfill DBI 251/4001 guidelines.
- News folder 07/2009
 - Water Mist Systems for Buildings-DBI
- Installation implemented by qualified personnel
 - Certified personnel under- DBI guideline 001, and 002

Supply Line for Nozzle



■ DN15 connection



■ Concealed sprinkler with flex pipe

Main Line



Main Pipe DN 50

FIRE FIGHTING



FIRE FIGHTING

Atrium



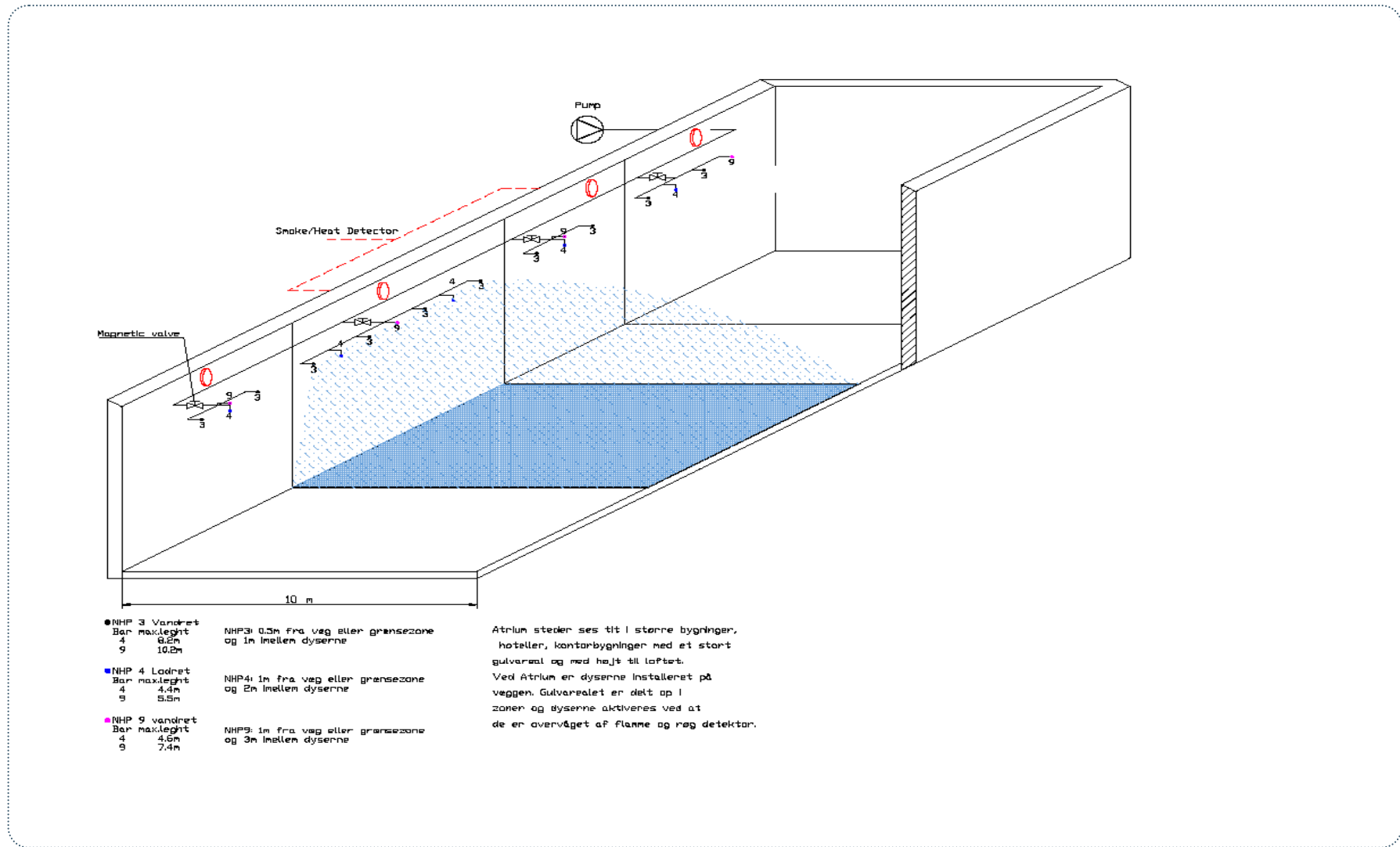
FIRE FIGHTING

Atrium Sprinklers



FIRE FIGHTING

Atrium solution



Sprinkler Room



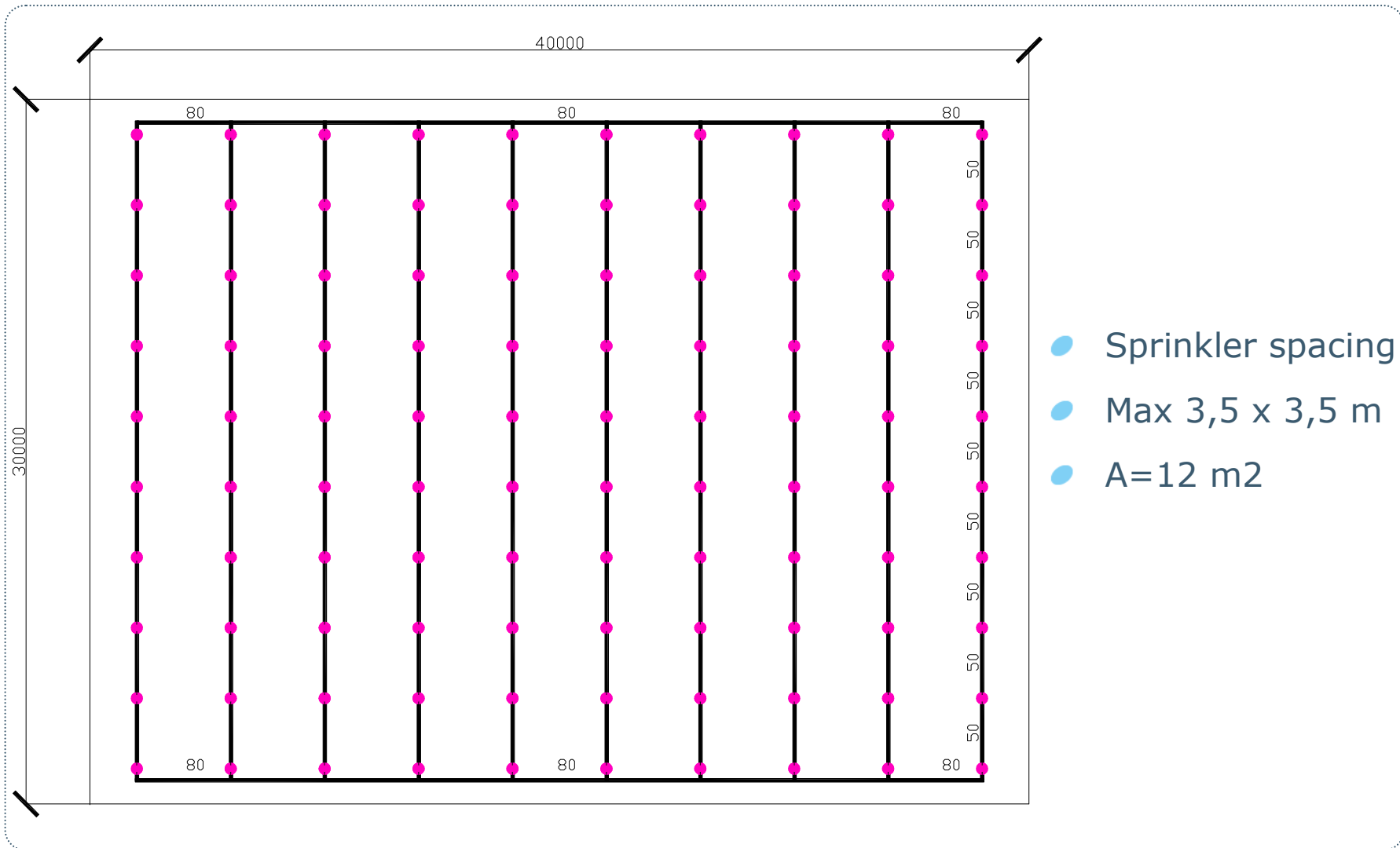
- Pump and Control panel in sprinkler room

MRK7

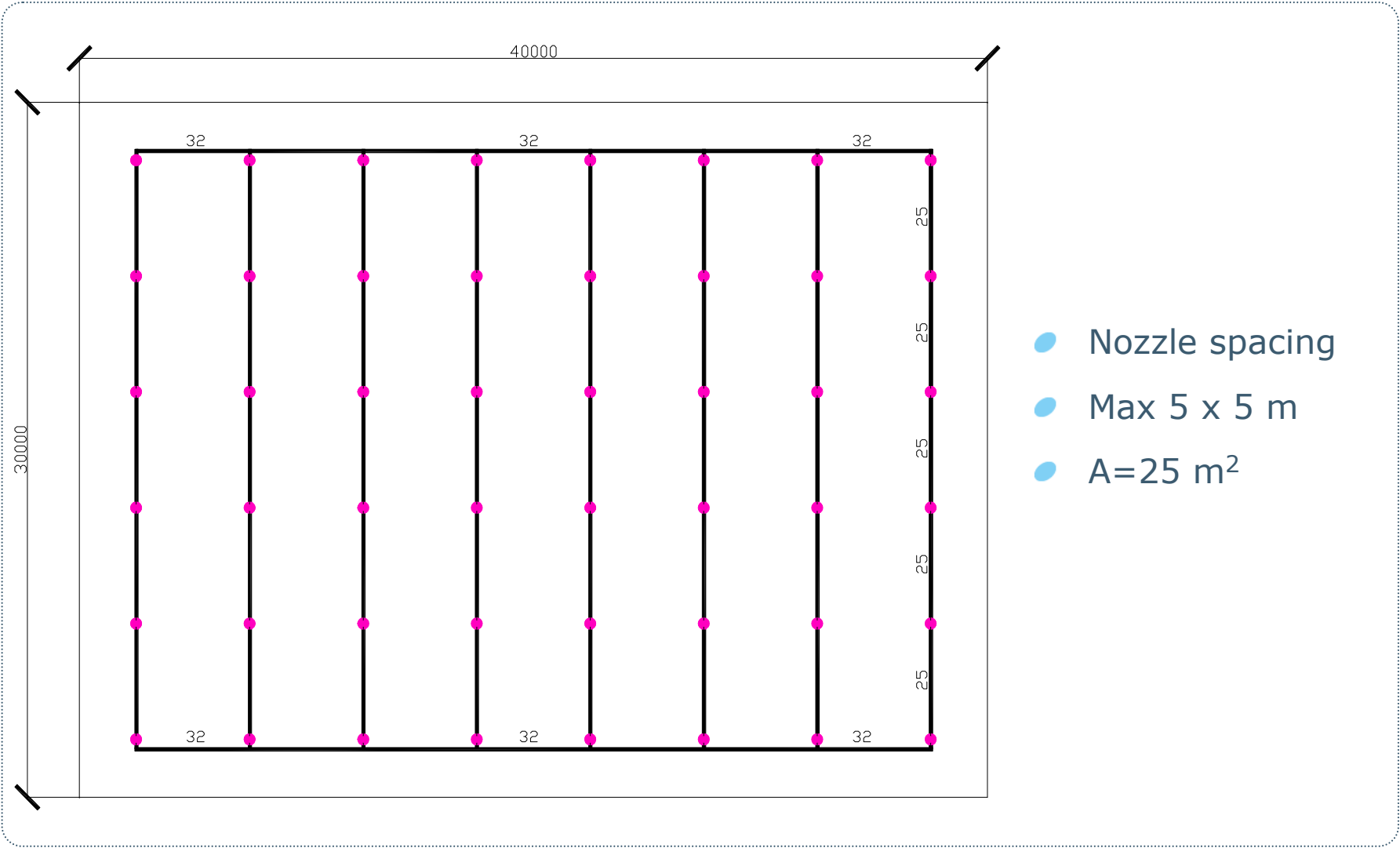
With installtion complete and all components in place, the only thing remaining is the Final inspection that is implented by DBI. And to inform you more on DBI is Ander Frost-Jensen director of Services at DBI.

Marie Karlsson; 07.09.2009

100 sprinklers/Loop system



48 nozzles NHP 18A



Price, Sprinkles vs. Water Mist



● Sprinklersystem

- Costprice, loopsystem dkr. 98.000,-
- Installationtime hrs. 132
- Sprinklerhead pcs. 100
- Min/m2 7,2
- More blue men, lift, tool

● Low watermistssystem

- Costprice, loopsystem dkr. 62.500,- (87.000,-)
- Installationtime hrs. 65
- Sprinklerhead pcs. 48
- Min/m2 3,85
- Less blue men, lift, tool



- Director of inspection and investigation services
Danish Institute of Fire and Security Technology

DBI -The Danish Institute of Fire and Security Technology



- DBI - a knowledge centre in the field of security and fire safety
- Denmark's leading knowledge centre in the field of fire safety and prevention. We maintain our knowledge through relevant participation in research and development activities and services that we offer private and public enterprises, institutions and authorities.

- Testing
- Advisory services
- Consultancy
- Inspection
- Research and Development
- Certification
- Investigations
- Publications
- Training
- Info

FIRE FIGHTING

Standardisation of watermist



- Increased popularity → need for standardization
 - Changing from sprinklersystems to watermist-systems need a approval from authorities
- Mist system
 - Water mist is like sprinkler and must uphold specific demands on energy and water flow, operation and maintenance
- New standard implementation of guidelines 2010
 - Mist guidelines 254

System Approvals in Denmark



APPROVAL STANDARDS

- VdS
- DBI – Danish Institute of Fire and Safety Technology
- FM Global
- UL
- Approval from Marine classifications

- Inspection requirements
 - Executed by accredited Inspection company
 - Approval from DBI and local fire authorities
 - Yearly inspections
 - Inspected after DBI Guideline 004
 - "Automatiske brandsikrings- anlæg - færdigmelding, inspektion og godkendelse"