WATERMIST Fire protection in DATACENTERS
IWMA Amsterdam
October 2015
Unica Automatic Sprinkler
HJ Kooijmans
Programme

- Introduction…
- Watermist, how does it work….?
- Watermist, what are the possibilities….? 
- Watermist in Datacenters
- Watermist testing for datacenters by FM
- Basic rules fire safety in datacenters
Unica technical installations

- 14 departments in the Netherlands
- 3 regions
- 1550 FTE’s
- Anual turnover € 235 mio
- 8 special business units
Unica fire protection

- Fire detection systems
- Extinguishing gas systems
- Watermist
- Sprinkler systems
- Manual extinguishers
- Dry risers
Conventional fire protection solutions in Datacenter …….

Automatic Fire detection

Extinguishing gas

Sprinkler
Datacenters now

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Next generation fire protection for datacenter…

Automatic fire detection

HPWM watermist

Sprinkler

Ext.gas
Water (mist) in datacenters?

- What about the impact of water on vulnerable apparatus?
- What about the impact of air velocity in data rooms caused by cooling systems?
- What about the relatively slow response of the heat triggered watermist system compared to smoke detector triggered gas systems?
Watermist …..How does it work?

Oxygen displacement benefits

- Reduction of oxygen concentration from 21% to 16.8% at the flame front during MicroDrop® discharge

Cooling benefits

- Reduction in temperature during initial 30 seconds of discharge from 590°C to 50°C

*samen maken we de toekomst*
Watermist in Datacenter

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Design criteria for Data Centers

Fire risks in datacenter are complex and various. Custom made solutions based on risk analyses are required.
Where can we apply watermist?

- Transformer rooms
- Generator rooms
- CRAC Units
- Data floors
- Raised floors
- Switch rooms
- Battery rooms
- UPS rooms
- Offices
Watermist in Data Center

The challenge....

Data room risk analyses
Fire in datacenter

risk pyramid

risk = chance \times effect

- Total loss-------------major damage
- small incident----------minor damage

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Fire in datacenter

L.O.D ‘s = Lines Of Defence

- Total loss---

- Small incident

Paper bin fire
damage <1k

Action by staff;
Manual extinguishers
Fire in datacenter
L.O.D ‘s Lines Of Defence
unmanned situation

- Total loss---
- Small incident

Fire extension
Damage <10K

Action by staff on site
Manual extinguishers

1st automatic fire detection
alarm by aspiration system
Fire in datacenter
L.O.D ‘s Lines Of Defence

- Total loss---
- Small incident

- Fire extension
damage <50K

2nd automatic fire alarm

Proces trip: ventilation: turn lower.
Power shut down
Data will be saved to safe area

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Fire in datacenter
L.O.D ‘s Lines Of Defence

- Total loss
- Klein incident

Fire extension
damage <100K

Watermistsystem will be filled with water, glasbulb in nozzle will be activated on temperature. Watermist will attack the fire locally.

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## Pro and contra’s

<table>
<thead>
<tr>
<th></th>
<th>Extinguishing gas</th>
<th>HP Watermist</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System price</strong></td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Footprint</strong></td>
<td>Big</td>
<td>Small</td>
</tr>
<tr>
<td><strong>Air tight enclosures</strong></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>Door fan testing</strong></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>Over pressure relief device</strong></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>System refill costs after discharge</strong></td>
<td>Y</td>
<td>N</td>
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<tr>
<td><strong>Cylinder approval</strong></td>
<td>Y</td>
<td>N</td>
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<tr>
<td><strong>Forced ventilation</strong></td>
<td>Y</td>
<td>N</td>
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<tr>
<td><strong>Availability extinguishing medium</strong></td>
<td>limited</td>
<td>Endless</td>
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<tr>
<td><strong>Material damage by thermo shock</strong></td>
<td>Y</td>
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<td><strong>Water damage</strong></td>
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<td><strong>Environmental impact</strong></td>
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### Table 6.1.2.2 Electrical Clearance from Water Spray Equipment to Live Uninsulated Electrical Components

<table>
<thead>
<tr>
<th>Nominal System Voltage (kV)</th>
<th>Maximum System Voltage (kV)</th>
<th>Design BIL (kV)</th>
<th>Minimum* Clearance</th>
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<tbody>
<tr>
<td>To 13.8</td>
<td>14.5</td>
<td>110</td>
<td>7</td>
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<td>23.0</td>
<td>24.3</td>
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<td>36.5</td>
<td>200</td>
<td>13</td>
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<td>250</td>
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<td>72.5</td>
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<td>121.0</td>
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<td>161.0</td>
<td>169.0</td>
<td>750</td>
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</tbody>
</table>

*Minimum clearance values are in inches and millimeters.
Compact pump units: plug and play

samenvassen we de toekomst
Manifold with 14 section valves

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Fire test HP France
1. Active forced ventilation,
2. Single and double-tier cable tray fires,
3. Interlocked dry pipe/preaction configurations

European technology and American test standards…
Is this a happy marriage ?
MEANWHILE AT VW'S EMISSIONS TEST CENTER

THAT'S ANOTHER PASS ✔
Basic rules for fire protection in datacenters

- Good housekeeping
- Early warning fire detection (aspiration system)
- Implementation of a „how to handle” procedure in case of fire and adequate training of staff
- Implementation of a process trip procedure
- Pre-action watermist system in data rooms
- The watermist system must be adjusted to the Inventory of the fire load.
Thank you for your attention

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