

Multiple Fire Risks

- ① Restaurant / Sky bar / Glass protection (OH1)
- ② Kitchen / Canteen (OH1)
- ③ Hotel / Hospital (OH1)
- ④ Residential (OH1)
- ⑤ Office / Conference room (OH1)
- ⑥ Stairs (OH1)
- ⑦ Data centre (OH1)
- ⑧ Library (OH1)
- ⑨ Laundry room (OH3)
- ⑩ Storage room (OH3)
- ⑪ Reception / Lobby (OH1)
- ⑫ Auditoriums (OH4)
- ⑬ Pump room / Technical room (OH1)
- ⑭ Underground car park (OH2)



High rise building fire risks and problematics



- Sometime only one staircase, of small width, which facilitate neither the work of the rescue
- Fire behavior of the facade
- Fire propagation from the outside to the inside
- Smoke propagation
- Use of new materials

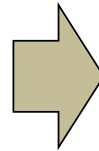
Design challenges

Correct risks analysis

Multiple risks : LH/OH1/OH2/OH3/OH4

Analysis of each level !

Example : Insulated sandwich panel for cold rooms



Make sure to have :

Correct nozzles (correct approval), correct ceiling height, correct amao.

Design of the pipe layouts

One or two riser ?

Looped networks per floor ?



Ensure to have the correct pressure at the nozzle!

Ensure to have the correct pump unit (pressure and flow rate), balancing coefficient for the pump unit flow rate is important! 10% or more.

LIFE SAFETY

Life safety system



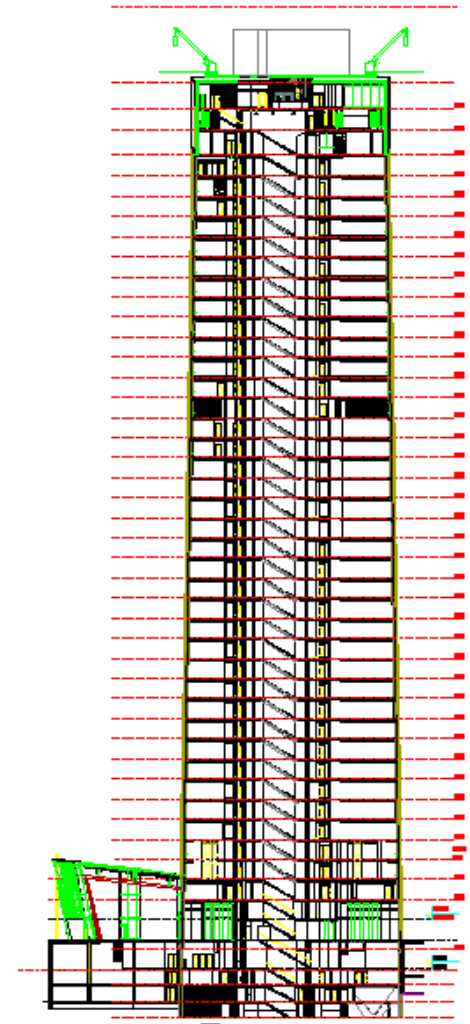
Guarantee the functionality of the system every time :

- ATS for the power supply
- Safety water supply (two main water supplies, water tanks)
- Master and slave unit full redundancy
- 2 section valves for each levels (or bypass if out of hours testing is possible)

Single sources of supply should not be used for critical/enhanced availability applications. Dual sources should be used to provide redundancy and improve availability.

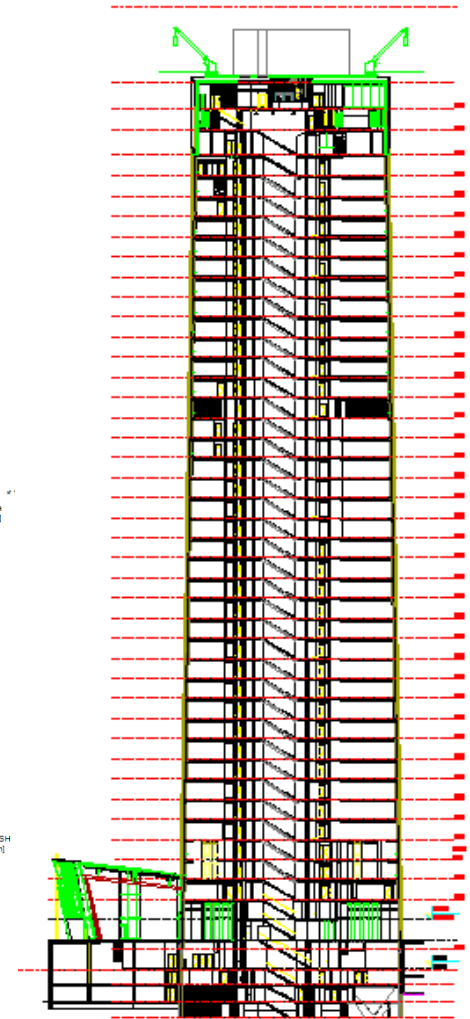
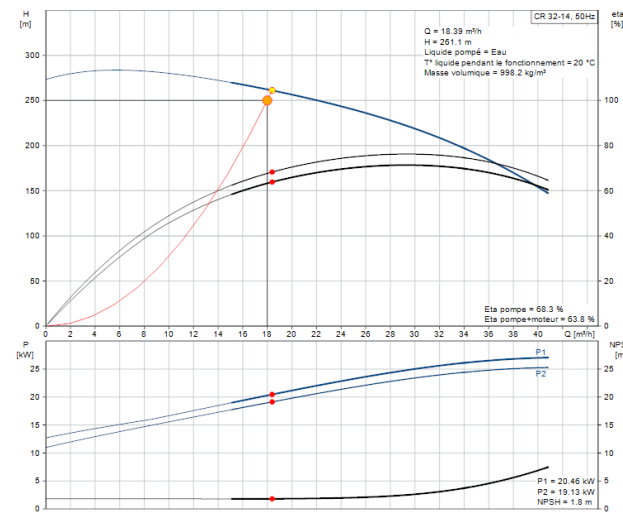
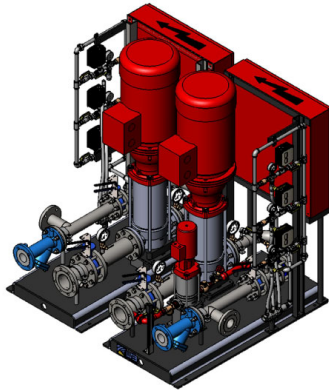
150 m height building example

- Risk analysis : Office building, Ordinary Hazard 1 (OH1)
- AMAO : 216 m²
- Number of nozzle OH-VSO in AMAO : 11 OH-VSO
- Max flow @8bar : 520 lpm
- Pump design : $520 \times 1,1 = 572$ lpm
- Design pressure at the pump : 150m (geometric height) + 80m (minimum pressure at the nozzle) + 20m (pipe pressure loss) = 250 meters (25 bar)



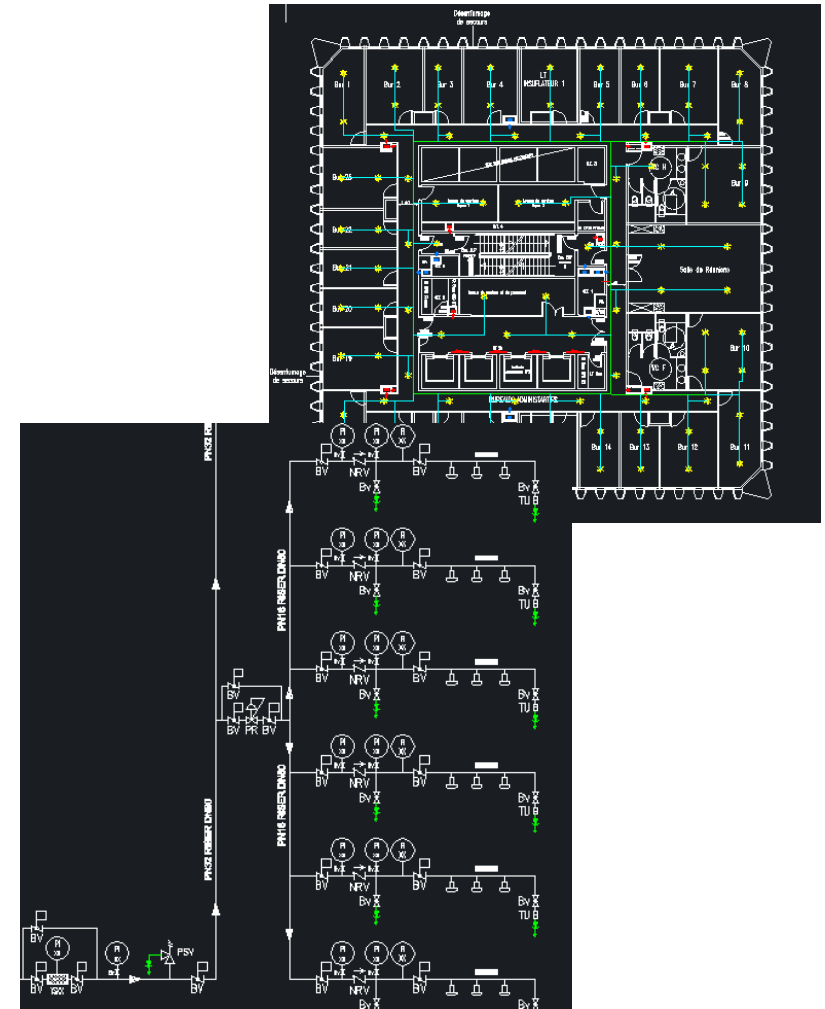
150 m height building example

- Typical pump arrangement : 2 pumps + 1 standby pump
- Each pump provide 50% of the water demand



150 m height building example

- Two options for the riser, (PN40 pipe) :
 - ✓ 1 main riser DN65
 - ✓ 2 main risers DN50
- Every 6 levels from the pump unit level a pressure reducer is used : standard pipe PN16 press-fittings after the pressure reducer,
- After 100 m height, no need to use a pressure reducer, standard pipe PN16 can be used



Comparison LPWM & HPWM

| | VFK | HPWM |
|--|-------------------|--|
| <i>Water pressure</i> | 8 Bar | 60 to 100 Bar |
| <i>Spacing</i> | 4,5 m | 4,0 to 5,00 m |
| <i>Design number of nozzles</i> | 11 | 9 to 14 |
| <i>Design flow l/min</i> | 520 l/min | 334 to 426 l/min |
| <i>Water tank 60 minutes discharge</i> | 32 m ³ | 21 m ³ to 26 m ³ |
| <i>Pump size</i> | 572 lpm | 388 lpm to 560 lpm |
| <i>Power consumption</i> | 60 kw | 108 kw to 150 kw |
| <i>Run current</i> | 112 amps | 224 amps to 280 amps |
| <i>Start current</i> | 476 amps | 588 amps to 644 kw |
| <i>Main riser</i> | DN65 PN40/PN16 | DN40 PN300 |
| <i>Pump unit cover 50%+50% flow demand</i> | YES | NO |

Main conclusions & recommendations

Low Pressure Water Mist fire protection systems is a suitable & competitive option for High Rise Buildings but :

- Respect the water mist fundamentals
- Beware of the national code and regulation for High Rise Building
- Use approved and certified products (DIOM)
- Validate each critical point during design stage

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Questions....

MORE THAN JUST FIRE PROTECTION