

High Pressure Water Mist for protection of High Rise Buildings

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Abstract:

Usually, sprinkler systems are used to protect the typical rooms in a high-rise building like hotel rooms, office areas, atriums and other areas. Due to an increasing environmental concern with high water volumes used in high-rise buildings and the increasing requirement for efficient system designs as well as centralized plant engineering, a demand for optional firefighting systems has risen.

The aim of this study was to investigate if water mist fire protection systems could provide an equal level of protection compared to sprinkler systems. The main task of this study was to perform fire tests to extend the effective area of a water mist nozzle head and to approve that a high-pressure water mist gun has the same suppression behaviour like a common fire hose nozzle. Therefore, a series of fire tests were conducted based on the standard office scenario according CEN 14972(“office”: fire under a wooden desk, based on OH1; closed nozzle system, nozzle height of 4,2m, nozzle distance of 5,2m). The main criteria to pass these tests and to receive the desired equivalence manifest in a positive and successful way was to extinguish the fire and to have at least the same or a less worse fire damage result than a conventional sprinkler system (sprinkler height 4,2m, sprinkler distance 3m). In a second step, fire tests for the fire hose nozzle to water mist gun comparison were carried out. The tests were monitored by pressure sensors and flow meters as well as thermocouples in order to record measurement data for subsequent analysis.

All tests were passed in a positive way.....indeed, it was established that water mist nozzle heads can cover wide areas in high rise buildings in a very efficient way. The additional conducted water mist gun tests confirmed an equivalence to standard fire hose nozzles, installed in high-rise buildings. In addition, the test results were used as design basis for a high-rise building project in Estonia (Maakri Tower).

Keywords: water mist system, high-rise building, water mist gun, office, hotel, OH1, Maakri Tower

The installation in the Maakri Tower consists of following equipment:

- Electrical power pack
- 12 km stainless steel pipes
- 2400 nozzle heads
- 58 pc of valves (alarm valves, flow switch, diverter valves,....)



Maakri Tower (still under construction)

Keyword: Maakri Tower, high-rise building, high pressure water mist

Our largest Project in a high-rise building is the office Tower in Frankfurt.

- During the modernisation of the building, the existing sprinkler system was removed and a new modern fire protection system was installed.
- Performance period: 2011-2012
- Project management: Aquasys
- Customer: German Bank
- Project description:
 - Water mist system for the protection of office floors, electricity distributor and technical rooms
 - 10.000 m piping and 2.249 nozzle-heads
 - Replacing the existing sprinkler systems with water mist technology.

