

Water Mist and Tall Buildings

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BIO¹: A qualified Engineer, his business consists of freelance activities specifically in the field of security for temporary and mobile construction sites, fire prevention and workplace security, work management for complex buildings and environmental impact assessment. As Visiting Professor at the Turin Polytechnic university he has lectured on “Fire Prevention in buildings” and “Fire Prevention Security” as part of the “Environmental Security Techniques” course. He was a senior official of the National Fire Brigade Corps at the Fire Brigade Headquarters of Turin with the following responsibilities: Deputy Commander; Head of Fire Prevention Office; Regional Technical Committee Secretary for major accident risk activities; Member of the Provincial Supervisory Commission for public entertainment venues. In 2009 he founded GAe Engineering, the natural evolution of Amaro’s professional activities initiated in 1996.

BIO²: Born in 1973, Eng. Massimo Ferretti is an electronic engineer who, after a first experience in telecommunications, has been working on more than 10 years in companies producing fire protection systems. Since 2016 he is an area sales manager for Marioff Italy proposing Water Mist HI-FOG® systems in land-based applications.

Abstract

In Italy, as well as in the rest of the world, water mist systems can be used if the performance has been verified through full-scale fire testing and 3rd party approval. Today there are a wide range of water mist fire test protocols that cover a large range of applications. All critical design parameters of a water mist system are defined during the full-scale fire testing, and once the water mist system has successfully passed the full-scale fire tests, the design can be applied for the specific application or fire hazard..

Although several fire test protocols have been developed,, that covers OH1 – OH3 applications found in a typical commercial building more and more often we face new application challenges linked to structural configurations that the modern architecture adds as challenges for the fire-fighting designer who, not only must choose the best protection system, but at the same time must select the best fire suppression technology that complies with both national and international building regulations.

The new headquarters of UNIPOL SAI, one of the leading Italian companies in the insurance sector, represents in Italy the first example of a high vertical development that has used high pressure water mist as fire suppression technology throughout the entire building complex.

The presentation will highlight some of the key aspects of the fire risk assessment process that resulted in selecting high pressure water mist fire suppression system for the entire building. Details on how different fire hazards and different type of occupancies influenced on the final system design will be covered as well as references to appropriate water mist test protocols and standards.

In particular, the presentation will highlight how the benefits of high pressure water mist influenced on the other protective measures, both passive and active, supporting the integration of a performance solutions supported by the use of CFD and exodus simulations.

For this project, it was critically important to consolidate all different fire test summaries, covering all the different occupancies in the building, and present them in a structured manner for the local AHJ approval.

The following is a summary table of the solutions envisaged in the project and of the test certificates taken as reference for the different types of occupancies of the building:

Id	Environment	Level of risk	Test protocol	Third part Certifier
A	Office	OH1	Annex A CEN/TS 14972:2011 – Fire Test Summary HI-FOG #024/OH1/SEP03-"system for Protection of Ordinary Hazards 1 (Europe) occupancies"	Vds
B	Office open on the big void	OH1	Annex A-CEN/TS 14972:2011-Fire Test Summary HI-FOG #024/OH1/SEP03-"system for Protection of Ordinary Hazards 1 (Europe) occupancies" As for offices. There is no standard test protocol to test this type of application. Performance is based on simulations.	Vds
C	Controceilings	OH1 (H > 30 < 80)	Fire Test Summary HI-FOG #011/CR/DEC03 systems for false floors and false ceilings	Vds
D	Auditorium	OH-4	Fire Tests for Water Mists Systems for the Protection of Non-Storage Occupancies HC-1 – Formerly Light Hazard Occupancies	FM and UL
E	Parking	OH-2	Fire Test Summary HI-FOG #008/OH2/FEB04 "System for protection of parking garages (Ordinary Hazard 2/Europe)"	Vds
F	Escalator	Deluge	Marioff – Being acquired VdS-Rolltreppen/escalator en_V1 (Draft) 20.08.09	FIRE Marioff test
G	Piano Garden	OH-2 Wet and Deluge	The wet system is based on Fire Test Summary HI-FOG #29/OH4/FEB07 Systems for cinemas, theatres, atria and similar high spaces.	Vds The performance of the deluge system is integrated and verified by simulations.

GAe Engineering worked closely with Marioff's technical experts during the initial project design phase to ensure an optimal design of the water mist system, meeting all the challenges of the high vertical development. As a summary, GAe Engineering will share some of the key learnings during the project. .

Keyword: Water Mist Systems, Tall Building, complex geometry, open spaces on large gaps, utilities on multiple levels of protection.