

Fire Test Protocols for Water Mist System Protection of Non-Storage Occupancies, Hazard Category 2 (HC-2) and Hazard Category 3 (HC-3)

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Bio: Jonathan Carpenter is a Senior Engineer working at FM Approvals in the Fire Protection Department. Jon is responsible for managing Approval projects for various extinguishing systems with a specialty in water mist systems. Jon is also responsible for the ongoing development of the Class 5560 “Water Mist Systems” FM Approval Standard. Jon has validated hundreds of water mist fire tests both at FM Global Fire Laboratories and for FM Approvals’ customers at laboratories around the globe as well as well as certified component testing at both FM Approvals and manufacturer’s locations.

Abstract

In recent years the standard bodies in Europe and United States have begun to expand the water mist protection of solid combustible fires beyond those in the light hazard occupancies. An exploratory study was thus conducted in FM Global Research to evaluate the efficacy of using water mist to protect the more fire challenging HC-2 and HC-3 hazards as described in FM Global Data Sheet 3-26. Subsequently, a follow-up investigation was performed to determine the ceiling height limits for effective water mist protection of the above two fire hazards in open environment.

Based on the work conducted by FM Global Research FM Approvals now intends to leverage the research work, and fire tests developed, to create new fire test protocols in the form of new fire test appendices in FM Approvals Standard Class 5560, Water Mist Systems. The objective of this presentation is to describe and illustrate the new fire test protocols and methods of testing water mist systems for these applications. The fire test protocols will include fire performance tests for both HC-2 and HC-3 non-storage occupancies. The HC-2 fire hazard is represented by a 2-tier high rack storage, each pallet load consisting of three nested double-wall corrugated cardboard cartons with a metal liner insert sitting on a wood pallet. The HC-3 fire hazard is represented by a palletized storage of cartoned expanded polystyrene of one pallet-load high. In each of these applications water mist systems will be tested at a multitude of specifications (ignition location, nozzle spacing, nozzle pressure, ceiling height, nozzle distance from ceiling, etc.) in order to test the water mist system’s ability to control the fire across a variety of design specifications.

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