

Understanding the new challenges in fire safety – Can water mist fire protection systems be the solution?

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Bio: Amr has 13 years' experience in Fire Protection in the Middle East and North Africa for International Design Firms and experience in Hydrocarbons, Infrastructure, Buildings, and Industrial. He is currently Field Business Supervisor for Middle East and Africa. Amr Mahmoud holds a M.Sc. degree in Fire Protection from Helwan University and is registered as a Professional Engineer from the Texas Board of Professional Engineers and New York State, USA.

Abstract

As the need for energy storage expands, lithium-ion batteries are becoming more present in the built environment. The scale of battery applications ranges from personal devices to energy storage systems intended to power an entire building. When lithium-ion batteries experience thermal runaway, they generate heat and sparks as well as both flammable and toxic gases, which can create fire and explosion hazards that challenge the built environment.

We will go through the Hazards of lithium-ion batteries and associated field incidents, Basic code requirements of NFPA 855 and Structure and testing requirements for UL 9540A.

We will go through a case study from our UL Solutions Laboratory in Poland where we are using Water Mist fire protection system as a solution for Battery Energy Storage Systems

UL 9540A, *Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems*. Addresses the key fire safety concerns (BESS installation parameters, Installation ventilation requirements, fire protection and fire service strategy and tactics).

We will explain the different installation level test methods:

1. Test Method 1 – "Effectiveness of sprinklers" is used to evaluate the effectiveness of sprinkler fire protection and explosion mitigation methods installed in accordance with code requirements.
2. Test Method 2 – "Effectiveness of fire protection plan" is used to evaluate the effectiveness of other fire and explosion mitigation methods (e. g., gaseous agents, water mist systems, combination systems).

We will explain the key findings of actual fire test using gaseous fire suppression and water spray system and if Water mist will be a solution for such applications.

KEYWORDS: Water mist fire protection systems, Battery Energy Storage Systems, Battery Energy Storage Hazards, Fire Safety, Fire suppression,