

Application: Fire Suppression for Energy Storage Systems and Battery Energy Storage Systems

Stat-X[®] condensed aerosol fire suppression is a solution for energy storage systems (ESS) and battery energy storage systems (BESS) applications.



What is a lithium battery?

A lithium-ion battery or li-ion battery is a type of rechargeable battery in which lithium ions move from the negative electrode to the positive electrode during discharge and back when charging.

The Risk

The deep-seated nature of battery fires creates extinguishing challenges for all extinguisher types.

Due to out gassing prior to and during ignition of the batteries, reflash is a potential hazard.

Unlike gas systems operating under high pressure seeking exit of the hazard area, Stat-X aerosol operates at a low pressure and remaining in the environment to provide ongoing protection.

Gas systems will exit the hazard area through any unclose able openings. The Stat-X aerosol remains buoyant and allows for uncloseable openings whereas in high pressure gas systems the gas will exit rapidly.

Advanced Technology

Stat-X highly-advanced fire suppression technology offers the lightest, most compact, and economical fire extinguishing solution available. Our Stat-X generator is an extremely rugged, hermetically sealed, stainless steel canister containing a stable, solid compound.

In the event of a fire, Stat-X units automatically release ultra-fine particles and propellant inert gasses which effectively extinguish fires using less mass of agent than any other conventional extinguishing system.

Applications and other Unique Characteristics

There are many applications for Stat-X fixed systems in several industries including energy storage and energy supply. In these industries, there is the hazard of lithium ion batteries, an extremely difficult fire to extinguish and control with several issues.



For example:

- Lithium batteries burn in an unusual manner
- Risk of explosion through exposure to heat or short-circuits in the batteries
- High risk of ignition associated with the electrolyte released through exposure to heat
- The residues left after combustion can cause powerful reactions or may be toxic
- Rising combustion gases ignite the goods stored at higher levels
- Only minutes are required for fire penetration right up to the underside of the ceiling
- Smoke and soot contaminate other goods stored in the vicinity
- Restricted access for firefighting due to the height and density of the stored goods
- In addition to the undesirable disruption to operations, a fire often results in a total write-off and environmental damage

- Maintaining delivery capability and goods availability without interruptions
- Prevention of dynamic fire propagation through the ignition of the closely packed, neighboring batteries
- No damage to the goods and systems by fire, soot, or the water used to put out the fire
- Permanent fire safety without restricting staff movements, use of the building, or influencing the goods, the flow of goods and the warehouse equipment

TEST RESULTS

The Stat-X aerosol extinguishing product was tested for efficacy in putting out Li-ion battery fires. It was found that the Stat-X agent successfully extinguished single and double cell battery fires. This testing was conducted in parallel with a large battery fire testing program. Fireaway Inc. contracted with DNV GL for testing to have its Stat-X product line included in the program.

The following conclusions can be made from testing of Stat-X aerosol fire suppression system.

1. Stat-X can put out a Li-ion battery fire.
2. Residual Stat-X aerosol in the hazard will prevent a re-flash of the fire.
3. Stat-X can reduce oxygen in an enclosed environment during a battery fire. Our DNV-GL FA test for O₂ levels that shows 18% and no drop.
4. Due to the deep-seated nature of a stacked battery fire, the Stat-X extinguisher removed heat from the interior of the cells more slowly than the exterior.
5. The residence time of gases and aerosols during Stat-X deployment is a function of when the atmosphere is ventilated.

Advantages of Stat-X aerosol systems for lithium ion battery hazards

- The hazard area does not have to be airtight. Calculations allow for uncloseable openings.
- Residual Stat-X aerosol in hazard area after discharge prevents reflash typical with lithium ion battery fires.
- Stat-X systems are bracket mounted within the hazard on the ceiling or walls taking no valuable floor space within the hazard
- There is no manifold or piping required reducing installation
- Labor and material costs
- There is no cylinder weighing or hydrostatic testing required.
- Ten (10) year operating life cycle

Contact

For more information, please contact Fireaway Inc. directly or contact a local distributor partner, see www.statx.com/distributors.

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