

Hot Topics

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Addressing the Challenge of Lithium-ion Battery Fires

As the use of lithium-ion (Li-ion) batteries becomes increasingly widespread across various electronic devices, the incidence of related fires, though not frequent, is on the rise. These batteries are now integral to systems such as uninterruptible power supplies (UPS) in computer server racks, presenting new fire hazards that were previously mitigated by separate battery rooms. Despite the growing concern, there is currently no extinguisher specifically designed to address Li-ion battery fires. Let's delve deeper into this issue.

While the frequency of Li-ion battery fires has increased, the underlying causes remain consistent. Damage, improper use, charging, and storage are the primary factors contributing to these incidents. The National Fire Protection Association (NFPA) highlights that the risk of overheating, fire, and explosions escalates when batteries are compromised, mishandled, or improperly charged.

Understanding the complexity of this fire hazard involves examining how these causes trigger chemical reactions that produce heat faster than can be dissipated. This leads to a phenomenon known as thermal runaway, where a battery cell enters a self-sustaining, uncontrollable heating state. Without cooling time, temperatures rise, causing the cell to burst into flames, which can then spread to adjacent cells, potentially destroying entire battery packs.

Continued on page 2





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Addressing the Challenge of Lithium-ion Battery Fires Cont'd

Once a Li-ion cell ignites, it burns at extremely high temperatures, exceeding 1100 °F, fueled by combustible gases that generate oxygen. Extinguishing a cell postignition is extremely challenging, as cooling adjacent cells is hindered by their compact arrangement and rapid heat transfer. The design of these battery packs further complicates the introduction of cooling agents. The cells are tightly packed (allowing rapid heat transfer) and the battery casings don't permit any cooing agents to be easily introduced until they are breached by the heat of a fire.

Typically, portable fire extinguishers serve as the initial defense against small fires (NFPA 10, 5.1.1). However, the expectation that they can control or extinguish Li-ion battery fires is unrealistic, as no extinguisher is currently listed for this specific hazard.

In light of this, it is crucial to implement an emergency response plan, complete with personal protective equipment and accessible extinguishing equipment, to contain fires at their source. Given the dangerous nature of these fires, immediate notification of the fire department is essential to prevent severe consequences. •



- $1. \ Lithium-ion \ Battery \ Safety, \ \underline{https://www.nfpa.org/education-and-research/home-fire-safety/lithium-ion-batteries}$
- 2. NFPA 10, Standard for Portable Fire Extinguishers, 2022 Edition



"Given the dangerous nature of these fires, immediate notification of the fire department is essential to prevent severe consequences."

Initiating Devices and Notification Appliances for Class I, Division 1 Hazardous Locations

In environments where flammable gases or vapors are present, specialized devices and appliances are essential. These areas are designated as "Hazardous Locations," necessitating the purchase of equipment that does not exacerbate the existing hazard upon installation.

NFPA 70, known as the National Electrical Code (NEC), is widely adopted across the United States. The NEC sets forth the minimum requirements for electrical installations and equipment in buildings, primarily to establish a foundation for ensuring safety and preventing fire hazards related to electricity. Numerous industries operate in areas with high concentrations of flammable gases, vapors, or liquids that are easily ignitable. Recognizing this risk, the NEC provides a classification system for equipment and installation methods to mitigate these hazards, maintaining protection against fires and explosions. This article examines the most severe hazard level, known as Class I, Division 1, which guides the selection and purchase of necessary equipment for these environments.

What is Class I, Division 1?

The NEC serves as the authoritative code for the installation of electrical equipment in buildings. Article 501 of the NEC outlines the requirements for hazardous locations, with Class I, Division 1 (Class I, Div. 1) representing the highest level of hazard. This classification pertains to areas where ignitable concentrations of flammable gases or vapors are present during normal operating conditions. Such conditions may arise due to repair or maintenance activities, leakage, or breakdowns that release combustible concentrations. In simpler terms, Class I, Div 1 locations are those where flammable gases or vapors are present continuously, intermittently, or frequently during normal operations.

Where are Class I, Division 1 products installed?

Understanding Class I Div 1 is crucial for identifying where explosion-proof products are necessary. These products are installed in environments such as:

- Oil and Gas Industry
- Volatile Chemical and Solvent Manufacturing
- Alcoholic Beverage Distilleries
- Spray Painting and Coating Booths
- Fuel Storage and Transfer
- Cleaning Businesses (using combustible liquid solvents)
- Battery Manufacturing





Initiating Devices and Notification Appliances for Class I, Division 1 Hazardous Locations Cont'd

Who performs the hazard analysis?

You are not required to conduct a hazard analysis yourself. This responsibility falls to the authority having jurisdiction (AHJ), the owner, or the engineering firm engaged by the owner. It is essential to ensure that they specify UL-listed or -certified equipment for Class I, Div 1 classified locations. At Brooks, our customer service representatives are ready to assist you in selecting the most appropriate products, leveraging our engineers' expertise and supplier communications to provide the necessary technical support for your project.

What types of equipment require explosion-proofing?

In these locations, all electrical equipment, including motors, lighting fixtures, switches, and fire alarm initiating and indicating devices, as well as notification appliances, must be explosion-proof and classified as Class I, Division 1 (Class I, Div 1). This equipment is specifically designed for safe installation and operation in environments where flammable gases or vapors are present continuously, intermittently, or frequently, thereby ensuring the safety of both personnel and facilities.

What are the criteria for equipment that meets Class I, Division 1?

Equipment classified under Class I, Div 1 must meet two fundamental criteria:

- It must be robustly constructed to withstand rapid internal combustion.
- It must prevent internal flames from spreading to the surrounding flammable atmosphere.

To ensure that internal flames do not escape the equipment and ignite a flammable mixture of vapor and air, the equipment must:

- Possess sufficient strength to withstand internal pressures from rapid combustion without rupturing.
- Be designed to arrest flames at joints and openings.

These insights enable you to communicate effectively with customers who require specialized equipment for hazardous areas containing flammable gases and vapors. Your customers have already recognized the need for Class I, Div 1 equipment. They will likely depend on someone who can swiftly understand their requirements for specialized explosion-proof equipment and proper installation to ensure safety at their facilities.

When ordering explosion-proof notification appliances from Brooks for hazardous locations, ensure that you specify equipment that is listed and labeled as Class I, Division 1.



TECHNICIAN TIP!

Equipment designed for Class I, Div 1 environments, including explosion-proof models, is also suitable for installation in Class I, Div 2 areas, offering an additional layer of safety. This is valuable information for your customers to enhance their safety measures.







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Restaurant System Critical Components for Semiannual Maintenance

To stay compliant with the manufacturer's manual and NFPA code 17A, maintenance must be performed on restaurant fire suppression systems every 6 months. Maintenance helps ensure the system is reliable and ready when needed. Here is an overview of the essential components that must be serviced semiannually by a qualified service technician.

Check with the Restaurant Manager

When you arrive, check in with the restaurant manager. You may know this person from previous service calls; if not, start by introducing yourself and the reason you are there. It is never good to downplay the importance of your time at the restaurant. Never say that you are there to replace the links and tag the system. Your customer will be invoiced for all the work you perform that will make the system codecompliant to help ensure it will work in the event of a fire.

Ask if there are any changes to the hazard (new appliances or different ones) and whether any problems have been identified during the monthly owner's inspections. Inform the owner that you will be performing a very thorough examination, including a system test, including the operation of detection and releasing devices and pull stations. You will make any necessary repairs and replace parts that are deficient and ones that could cause system impairment. This quickly sets the tone for your service call and establishes the importance of the work you are about to perform.

Perform a Visual Examination

Verify the hazard has not changed, including replacements, modifications, or relocations of appliances. Make sure nozzles are directed at appliances and have their blowoff caps or foils. Check tamper indicators are not broken, and pull stations are unobstructed and undamaged, including checking for break rods on the pulls. Ensure pressure gauges are in operable range and the previous maintenance tag is in place. Lastly, check for obvious damage or conditions that would prevent the system's normal operation.

All these items are the things that the manager should be checking monthly (NFPA 96, 8.2.2). But it is important that you also perform these checks during the semiannual maintenance.

Trip the System

The system needs to be operationally tested, but before tripping it, disable it with a locking pin and remove the actuation cartridge.

Once you are sure the system is not going to actuate, perform both automatic and manual functional tests as follows:

- Simulate automatic operation by cutting a test link or other releasing device.
- Simulate operation at pull station(s).

Note: The gas valve should close automatically during these tests and needs to be manually reset.

Once cables are slack, it is a good time to check for grease buildup in conduit and fittings. Also, check corner pulleys and tee pulleys for excessive grease. If they are binding or even sluggish, replace them. Any misalignment of piping (conduit) or fittings becomes obvious. Perform the troubleshooting, identify the problem, and make the fix. Never leave cables that are not moving freely. Replace cable, conduit, and fittings that are identified as problematic. Be confident of cable movement, as it is critical for safety.

Now that the simulation for the automatic system trip has been completed, you can begin the simulation for the manual pull station system trip. Once you are sure everything works normally, manually reset the gas valve so that cooking operations can resume.

Install New Links

Make sure to replace all the fusible links in the system with new ones. The latest links must have the same temperature rating as those being replaced unless you suspect an issue. If you are replacing links while there is cable tension, make sure to use link pliers. Lock them in place, pop out the old link, and install the new replacement link. Here is a handy table to help with your analysis.





Restaurant System Critical Components for Semiannual Maintenance Cont'd

Fusible Link Temperature Ratings

	Maximum Ambient Temperature		Temperature Rating	
Temperature Class	°F	°C	°F	°C
Low	90	32	125-130	52-54
Ordinary	100	38	135-170	57-77
Intermediate	150	66	175-225	79-107
High	225	107	250-300	121-149
Extra high	300	149	325-375	163-191
Very extra high	375	191	400-475	204-246
Ultra high	475	246	500-575	260-302

Crimps, S-hooks, and link brackets are easy to change at this time. Check for bent brackets, corrosion, or other damage. Replace problematic brackets, crimps, S-hooks, and cable that can cause the system to malfunction.

Check System Cartridges and Hoses

Weigh and verify the actuation cartridge complies with the stamped weight. Whenever you change a nitrogen or carbon dioxide cartridge, record the replacement date in the space provided.

Examine hose assemblies for cracks or damage. Replace any hoses that show signs of problems.

Restore System to Operational Condition

Once the system has been examined, tested, and repaired, restore the system to operational condition by removing the locking pin and reinstalling the cartridge. Initial the service tag and record the year of manufacture and installation date of fusible links. Ensure you provide the manager with the maintenance report of your work with any safety recommendations.

Although the owner is ultimately responsible for inspecting, maintaining, testing, and charging the system, your expertise and attention to detail will help ensure that the system complies with the code and the manufacturer's manual and ensures the safety of restaurant workers and patrons. •





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For over 15 years, Brooks has published their monthly **Tech Series** and quarterly **Hot Topics**. Featuring fire and life safety articles, product information, and essential codes and regulations, these publications are a cornerstone in keeping you current on the critical information you need to do your

job protecting life and property.



Check out our latest Tech Series about NiCad Battery Connectors here to see for yourself or go to the Hot Topics Archives and Tech Series Archives on the Brooks website for all of our past and present publications.



VIEW ARCHIVES

NFPA Changes Hose Connection Product Requirements

NFPA 14, Standard for the Installation of Standpipe and Hose Systems, outlines the essential requirements to ensure that systems function effectively, providing reliable water supplies during fire emergencies. The latest revision has reorganized the document for improved usability and alignment with NFPA 13, Standard for the Installation of Sprinkler Systems, recognizing their frequent concurrent use. This reorganization guides users through the document as if they are designing a standpipe system, beginning with water supply, moving through underground components, system elements, installation, design, plans, and calculations, and culminating with system acceptance testing provisions. While there are numerous critical technical updates to consider, the following highlights the key changes regarding hose connections.

Protecting Hose Connection Threads

In response to concerns regarding cap failures due to pressure accumulation behind non-rated caps, which could cause significant water damage, water hammer, or personal injury, the NFPA Technical Committee on Standpipes has introduced a new provision in the 2024 edition of the standard. This provision mandates that hose connection caps, which are not pressure-rated for use with an open hose valve, requires one or more openings with a total cross-sectional area of at least 1/8 inch in diameter. This requirement ensures that building owners can detect valve leaks and address necessary repairs promptly, while also preventing dangerous pressure buildup that could result in catastrophic failure or injury to firefighters or inspection, testing, and maintenance (ITM) personnel when removing a pressurized cap.

Locking Cap

Caps serve to protect the connection threads from potential damage. Without secure locking, brass caps can be easily removed by vandals and sold as scrap metal. The NFPA Standpipe Technical Committee discussed the issue of locking hose connection caps. Initially, the committee's first draft report for the 2024 edition proposed a ban on locking caps, citing the risk of disabling a standpipe system if the cap cannot be removed during a fire. However, that stance was reversed in the second draft, acknowledging situations where lockable caps are necessary. According to the current standard, hose connections must feature external National Hose Standard (NHS) threads. In cases where they do not align with NFPA 1963, Standard for Fire Hose Connections, the Authority Having Jurisdiction (AHJ) will specify the appropriate hose threads.

Furthermore, lockable hose connection caps are permitted by the approving AHJ, with locking mechanisms for both hose connection caps and fire department connection (FDC) caps or plugs being keyed alike. The annex language clarifies that the fire department can efficiently operate with a single key or removal tool, thanks to the uniform locking mechanisms on both the lockable hose connection caps and the FDC caps or plugs. It is advisable to consult the AHJ if locking caps are desired, ensuring coordination with equipment manufacturers and all relevant parties requiring access.

The NFPA Technical Committee on Standpipes is currently reviewing language for the 2027 edition of the standard. Both topics have received public input for consideration at the First Draft Meeting May, 2025 in New Orleans, LA, which was attended by Brooks Equipment.

Conclusion

These measures enhance safety by safeguarding the hose connection threads from damage, prevent dangerous pressure buildup, allow locking caps that are sometimes necessary, while enabling the fire department to perform its duties. •

Brooks Equipment offers Knox® Locking Caps and Accessories!

SHOP



Meet Clair Deese, Sales Account Manager

I began my journey with Brooks on February 17, 2025, in Charlotte, North Carolina. Before joining the company, I worked as a Purchasing Assistant at FireTron in Texas, where I had the opportunity to work with Brooks through my role.

Now, as a Sales Account Manager, I enjoy building strong relationships and supporting our clients—all while working remotely flexibly. What I love most about my job is the people I work with and the ability to work from home.

If I weren't in this role, I would probably still be working as a Purchasing Assistant

It's a role I've always found rewarding.

My personal mantra is, "Live life to the fullest." That mindset carries into my personal life, where I enjoy spending time with my family and dogs and dreaming of being at the beach or in Greece, two of my favorite places in the world.

One food I absolutely can't resist is white corn, especially corn on the cob. And the most essential career lesson I've learned so far? "Teamwork is everything."

I'm proud to be a part of the Brooks team and excited about the future. •



Clair Deese (Center Foreground) spending time with family at a nephew's game.

Legislation & Code



Brooks Tracks Legislation and State Rulemaking

STATE UPDATES

Maine and PFAS

In 2024, Maine passed legislation banning the sale of products containing Perfluoroalkyl and Polyfluoroalkyl substances (PFAS), including clean agents (F-gases). FEMA engaged lawmakers and filed for an exemption through the Department of Environmental Protection (DEP) to allow clean agents for certain essential uses. The state regulatory process is still underway.

California and PFAS

Like Maine, California Senate Bill SB 682 aims to phase out the use of products containing PFAS, including clean agents, starting in 2027 through 2040. FEMA submitted a letter in April to the Senate Health Committee providing extensive information regarding clean agent fire suppressants and a list of essential uses as California debates the legislation. FEMA and Books will continue to monitor this bill.

Other States and PFAS

FEMA and Brooks are monitoring PFAS legislation in states across the country for impacts on fire equipment.

Washington State Licensing

Washington State Building Code Council (SBCC) adopted new licensing requirements requiring NICET certification for pre-engineered fire extinguishing systems. Brooks and FEMA, in conjunction with state FEDs, secured a code change that protects ICC/NAFED certification for pre-engineered kitchen and industrial systems that have been allowed in the state for many years.

Vermont EPR and Extinguishers

Vermont passed a law in 2023 introducing Extended Producer Responsibility (EPR), known as Act 58. The new EPR policies require product manufacturers to provide free statewide recycling of certain consumer products. Vermont's EPR policy has been updated to include fire extinguishers in its EPR policy. FEMA GRC is engaging Vermont to seek an exemption for commercial/industrial portable fire extinguishers to avoid burdensome monetary impacts on FEDs and extinguisher manufacturers.

Kidde Commercial Products are READY TO SHIP!



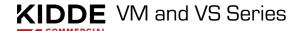


Conventional Fire Alarm Control Panels

 Offering the very best conventional fire alarm control technology available today and balancing it with features that benefit small building installers, contractors, building owners and occupants alike.

Shop FX Series





Kidde Commercial **VM Series** life safety control panels bring cutting edge flexibility and performance to mid and large-size applications. Their multi-message displays, intuitive interfaces, and the ability to support the exact features you need mean Kidde has your back.

VS Series are intelligent fire alarms for small to mid-range applications with advanced features and a robust design, existing wiring can be used for a system that's just as easy to maintain as it is to install.

Shop VM and VS Series

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