BROOKS EQUIPMENT

Volume 22, **Issue 3** | 3rd Quarter

Hot Topics

2023

Helping You Protect Lives And Property

Inside

Early Detection Means Fire Prevention for Server Rack Lithium-Ion Batteries

Over the past decade, computer room backup power has transitioned from reliance on lead-acid batteries to lithium-ion batteries. In the past, it was common to have a separate battery room filled with lead-acid batteries. Today the server backup-power is provided by lithium-ion batteries, which are installed in the server racks. These lithium-ion batteries are the backup in the event power from the grid is interrupted (e.g., power failure). This preferred battery technology is specifically designed to fit standard server racks. Suppose the main source of power is lost. In that case, the computers are automatically switched over (almost instantaneously) to lithium-ion batteries, which provide uninterrupted power supply (UPS) to critical equipment, including computer servers, storage devices, and networking equipment. The batteries are an essential component of the server room infrastructure to ensure business continuity. They are considered as critical as the climate control equipment used to cool the computer equipment. But most rack servers are not adequately protected from business interruption or data loss that can occur with a thermal-runaway fire of lithium-ion batteries.

Recent Fire History

Although your customers understand the importance of maintaining UPS and climate control, they probably don't understand how important it is to prevent

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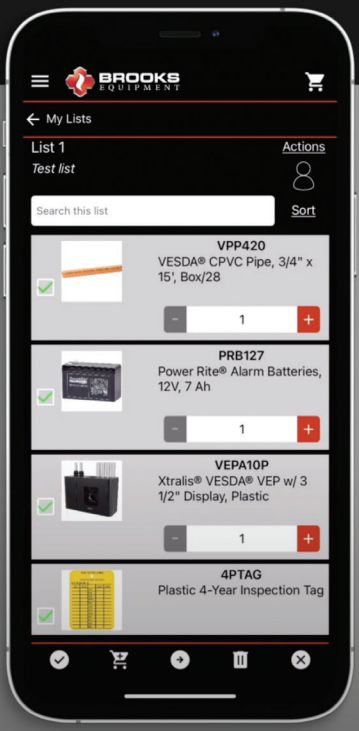

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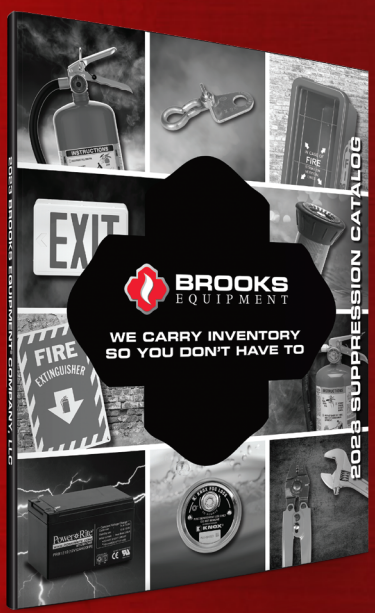

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Early Detection Means Fire Prevention for Server Rack Lithium-Ion Batteries

thermal runaway of their lithium-ion batteries. They may be lulled into a false sense of security, thinking the building's automatic sprinkler system solves the fire problem. The reality is that the sprinklers might control a rack server fire and keep the fire from spreading beyond the rack(s) of fire origin, as was the case with the Digital Realty data center fire in El Segundo, California, on Sunday, May 21, 2023[1]. Although the sprinkler system limited the damage from heat from the fire, the impact of the loss was substantial. According to an online article on data center fires, "… these incidents can cost data center operators anywhere from $250,000 to over $500,000 per hour of outage"[2].

Fire Sprinklers have Limitations.

Since sprinklers will only limit fire damage, the objective with lithium-ion batteries should be to prevent these fires altogether. That is where the Xtralis Li-Ion Tamer rack monitor comes into play. This Xtralis system detects the venting of battery electrolyte vapors (off-gassing phase) that occurs during the early failure mode of a lithium-ion battery. Early detection allows mitigation prior to thermal runaway and a catastrophic battery fire.

Li-Ion Tamer Group

Early Warning and Mitigation

The Li-ion Tamer Rack Monitoring system, is plug-and-play technology. It is easy to install by knowledgeable low-voltage technicians qualified to install fire detection systems in buildings.

Here is an overview of the off-gas sensors used in the Xtralis Li-Ion Tamer:

- Sensors are installed at each battery rack.
- Sensors are acutely sensitive to lithium-ion battery electrolyte vapors.
- Sensors monitor off-gassing prior to a fire event.
- Sensors do not require calibration.
- Sensors are compatible with all forms of lithium-ion batteries.
- Sensors have a lifetime comparable to a typical lithium-ion battery system.
- Sensors identify when and where off-gassing is occurring prior to a fire event.
- Sensors are connected to the controller that contains proprietary logic.

Ease of Operation and Low Maintenance

The Xtralis Li-ion Tamer rack monitor is operational once installed and requires minimal maintenance since the sensors are calibration-free and have a comparable lifetime to that of the lithium-ion battery system. Sensor response is easily verified with a bump test. To confirm operation, sensors are activated with a bottle of battery off-gassing material (diethyl carbonate) available from Brooks.

Fire Safety Strategy

It is important to stress to your customers that this system does not prevent fires or thermal runaway. It is an early-warning system that is not stand-alone and needs to be integrated with the overall fire prevention and fire safety strategy. The important thing to stress is that when the system responds, a risk of battery fault has been identified, which could lead to thermal runaway and fire. There is time for intervention (shutdown and battery removal). That is because there will be several minutes between early detection and the time it takes for the problem cell(s) to generate sufficient heat to cause fire. The time varies from just a few minutes to 30 minutes or more, depending on battery types, configuration, and cause of the thermal runaway. To avoid injury, most personnel need to leave the area immediately and follow the company's written fire plan.

Business Expansion Opportunities

There are thousands of server rack rooms without the safety of Xtralis Li-Ion Tamer rack monitors. Inform your customers that you have the solution that allows intervention before lithium-ion battery thermal runaway and before a fire breaks out. Notification and intervention allows your customers to maintain business continuity and remain profitable.

Safety and preventing data loss and business interruption from a devastating fire are the objectives. Installing the Xtralis Li-Ion Tamer has the potential to save your customers millions of dollars where lithium-ion batteries threaten their data and business continuity. ✦

[1]*Fire Hits Digital Realty Facility in El Segundo, California, Two colo halls closed by the fire department after a blaze in the racks, Peter Judge, May 25, 2023, https://www.datacenterdynamics.com/en/news/fire-hits-digital-realty-facility-in-el-segundo-california/.*

[2]*Data Center Fires: A Detailed Breakdown with 19 Examples, Mary Zhang, May 25, 2023, https://dgtlinfra.com/data-center-fires/.*

New 2023 Updates to Restaurant Fire Safety

NFPA recently released the 2024 edition of their restaurant fire safety standard, NFPA 96 *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*. The effective date is May 13, 2023, and supersedes all previous editions of the standard. Although the updates and new criteria are not retroactive and do not apply to facilities and equipment that existed or were approved for construction prior to this effective date, you should consider using the latest edition in lieu of the edition that is adopted and enforced in your jurisdiction. That is because the most recent edition contains the "state-of-the-art", meaning it is the most recent development of the standard, incorporating the newest ideas, and the most up-to-date features. Those new safety improvements will most likely be permissible and embraced by your local AHJ. But check with your AHJ prior to use and implementation.

Although the standard was originally intended for restaurants in buildings, it has been updated from those earlier editions and now also applies to mobile and temporary cooking operations, including food trucks, trailers, and tents. Although previous editions contained repetition to accommodate both stationary operations (restaurants) and the new mobile operations (food trucks), the 2024 edition eliminates that repetition. For example, chapters 4–9 apply to buildings and to mobile and temporary cooking operations. That is because, from a safety standpoint, those minimum requirements apply to hoods, grease filters, exhaust ducts, air movement, and auxiliary equipment that is installed in both buildings and food trucks. The differences in applications for fire-extinguishing equipment can be found in Chapters 10 and 11. Chapter 10 applies to buildings and 11 is for food trucks. Since the inspection, testing, and maintenance (ITM) for the equipment is the same for both buildings and vehicles, all ITM is covered in Chapter 12. That makes it easy for you and your customers to stay in compliance and not get cited for a violation. Additional safety provisions for food trucks can be found in Chapter 17, *Mobile and Temporary Cooking Operations*. That chapter has extensive information on LP-Gas (propane), which is used extensively in food trucks. There is also a requirement for carbon monoxide detectors in food trucks (17.10) and sometimes not found in restaurants.

Common Requirements for Restaurants and Food Trucks

Safety Provisions	Restaurants	Food Trucks	✓
Fire Extinguishers	10.9	11.7	
Class K Extinguisher Placard	10.2.2	11.2.1	
Automatic Extinguishing System	10.2.3	11.2.2	
Gas Appliance and Power Shutoff	10.4	11.3	
Sealing of Penetrations (abandoned pipe)	10.2.7.2	11.2.3.2	
Pull Stations	10.5	11.4	
System Annunciation (audible and visual)	10.6	11.5	
Replacement of Fusible Links (semi-annual)	12.2.4	12.2.4	

The provisions for food trucks were derived from those necessary for protection of restaurants, but careful thought went into the new criteria for food trucks. Although most restaurants have a wet chemical system in the hood, NFPA 96 allows other systems to be used for restaurants in buildings. But for food trucks, a UL 300 system must be installed in accordance with NFPA 17A (11.2.2)[2]. There are no other options besides pre-engineered wet chemical systems for the protection of mobile and temporary cooking operations. For food trucks, there must be Class K extinguishers, extinguishers for other hazards (complying with NFPA 10), and where there is a generator with engine, there must be a 20-B:C extinguisher installed specifically for that hazard (11.7.5)[3]. When the hood system operates in a food truck, people in the vicinity must be notified and the fire department must be able to identify the vehicle with the fire. Consequently, food trucks must have at least one audible and visual notification device installed on the outside of the vehicle (11.5.2).

Of significant importance are the new training requirements for food truck workers. Those requirements are extremely important for safety and should not wait for local adoption of the 2024 edition of NFPA 96. Here is an extract for your use and discussions with local vendors and the AHJ.

You should consider sharing your knowledge of these topics and offer training to the local fire inspectors and the owners and operators of food trucks, trailers, and other mobile and temporary cooking operations.

New Food Truck Training Requirements Extracted from NFPA 96, 2024 Edition[1]

17.11 Training.
17.11.1 Prior to performing cooking operations, one worker shall be provided with initial training in emergency response procedures, including the following:

(1) Using portable fire extinguishers and extinguishing systems
(2) Shutting off fuel sources
(3) Notifying the local fire department
(4) Refueling internal combustion engine power sources and LP-Gas container change-out
(5) Performing leak detection of LP-Gas
(6) Understanding fuel properties

NFPA continually updates and improves safety for commercial cooking operations. It is our job to utilize the most recent editions of the NFPA standards, which contain the newest ideas, up-to-date features, and improvements in safety. ✦

[1]NFPA 96, Standard for the Ventilation Control and Fire Protection of Commercial Cooking operations, 2024 Edition.

[2]NFPA 17A, Standard for Wet Chemical Extinguishing Systems, 2024 Edition.

[3]NFPA 10, Standard for portable Fire Extinguishers, 2022 Edition.

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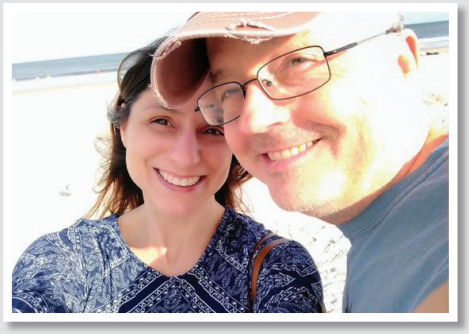
Employee Spotlight

Meet Brian Ritchotte, Knox Trusted Partner Coordinator



In September 2022, Brian joined Brooks as our KTP (Knox Trusted Partner) Coordinator. It was the second time he had worked for Brooks, having joined us in 2006. Then in 2013, he left the company when he moved to Colorado. But he's back home now, both in Charlotte and with Brooks.

Before joining Brooks, Brian was a Customer Experience Manager for the IT help desk of a Managed Services Provider. He was also a supervisor for the Transportation Department in a Colorado school district.

Today, Brian is the KTP Coordinator of Brooks' Knox Trusted Partner Program. He works with Knox's Trusted Partners to help them with all their Knox product needs, ensuring they get exactly what they need, when and where they need it.

Brian likes working with and getting to know his customers too. "It's a great feeling when you make things happen for the customer, and you've helped make their day," he says. "We have great customers and a great team at Brooks to work with," he says.

If not working at Brooks, Brian says he would probably be doing some tech-related sales or management or possibly working on writing a book. "I've always had a passion for technology, but my dream would be to write novels," he claims. And his motto: Time is your currency—don't waste it, spend it wisely.

Brian's favorite place anywhere in the world is anywhere there's a warm beach. And his favorite food is tacos. So maybe a beach somewhere in Mexico would probably work just fine for him.

When not at work, Brian enjoys spending time with his wife, Jenny, and his two children, Ally and Conner. Besides going to the beach, he likes watching football or reading a good book. Something most people don't know about Brian is that he married his wife by eloping to Las Vegas. We should have asked him if Elvis performed the ceremony. ✦

Preventing Costly Irrigation System Freeze-Ups

If you inspect and repair backflow preventers and don't offer winterizing services for your customer's irrigation system, here is a quick overview of how to start.

Freeze damage to your customer's irrigation system is usually very expensive to repair. So, the important message to your customers is "a freeze-up is easily preventable". The service that our industry calls "winterizing" will prevent freeze-ups and costly damage. That is why you should make sure to schedule winterizing for all your customers with irrigation systems in the fall. Most likely, they will appreciate your efficiency, knowledge, skills, and the reasonable fee you charge to provide this service. But most of all, your customers will have the peace-of-mind that a freeze-up will not occur if their system is winterized correctly. Here are the insights you will need to perform this task effectively.

The first step is to close the main shutoff (supply) valve to the irrigation system. The main shutoff is located indoors, typically right where the irrigation piping comes out of the building. Once you close the main shutoff, you will not have to touch this valve again until the spring, so it is a good idea to tag it **"Keep Closed During Winter"**, so your customer does not open it accidentally after you leave.

The next step is to open the main drain valve, but make sure to place a bucket beneath the drain valve prior to opening it. Once the drain valve is open, go outside and open the pressure vacuum breaker (PVB) outlet drain valve and all test cocks (typically two cocks) on the PVB. The inlet and outlet shutoffs for the PVB should already be open, since the irrigation system was operational during the spring, summer, and early fall. If not, make sure to open these valves. You can now go back inside and check the bucket beneath the drain valve at the main shutoff valve. The bucket will have a small amount of water that drained back from opening the test cocks and outlet drain valve. Take the bucket with you and empty it outside and head over to the PVB again.

Pressure Vacuum Breaker with Shutoff Valves

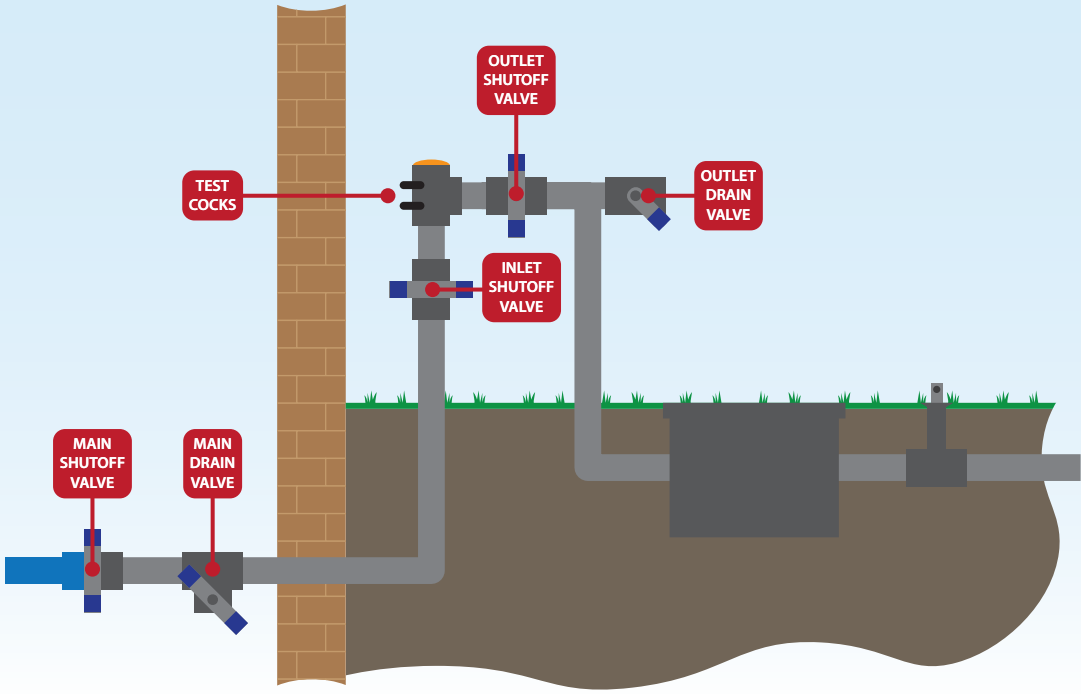
Next, you will need to close the outlet shutoff valve prior to blowing out the irrigation piping with your compressor. Make sure to always close this shutoff valve to protect the internal component of the PVB. Now you can connect your compressor hose to the outlet drain valve. Leave this valve open and begin blowing out the irrigation piping. Remember to never blow out the irrigation piping using the test cocks, as this could damage the internal components of the PVB. For large irrigation systems, you will be blowing out each zone, one at a time. By sequentially blowing out each sprinkler zone, you can observe the operation of sprinklers and visually spot any obvious issues that need attention. Once you have blown out the irrigation piping system with compressed air, disconnect the air hose from the outlet drain valve for the PVB.

Once the system has been blown out and water completely evacuated from the system, the final step is to partially open the two drain valves, all test cocks, and the inlet and outlet valves to the PVB. The industry practice is to leave these valves at a 45-degree angle, which will approximately be at the half-open/half-closed position. The main shutoff valve remains closed until recommissioning the system in the spring. For areas where there might be people present during the cold months, you will definitely want to tag this valve with a message that it is to remain closed during the winter to prevent filling of the empty piping system.

Your job is now done for the winter. You will be back in the early spring to recommission the system. Recommissioning the system is the easy part. You will be closing the test cocks and outlet drain valve at the PVB. Then go inside and close the main drain valve. Then open the main shutoff and do not forget to remove the tag and take it with you. You do not want to leave behind an erroneous tag that can cause confusion. Next go back outside and open the inlet shutoff valve to the PVB. You will hear a "pop" as the PVB

seals shut. Now slowly open the outlet shutoff valve for the PVB. This action keeps pressure on the PVB while allowing the sprinkler piping to fill with water. Once the piping is filled with water, it needs to be fully opened. The system in now in an operational condition for the warm-weather months of irrigation.

Make sure all your customers with irrigation systems are on your schedule for winterizing service. The nominal fee you will charge to prevent freeze damage is a fraction of the cost for repairs if they were to have a freeze-up. ✦



Valves Positions During Winter Shutdown

Legislation & Code

Brooks Tracks State Code Updates and NFPA Revisions

Washinton State is in the early stages of updating their state fire code. The Washington State Building Code Council (SBCC) formed a Fire Code Technical Advisory Committee (TAG) to provide advice on potential updates. The Fire Equipment Manufacturers Association (FEMA), Government Relations Committee (GRC) met in August and reviewed the proposed updates. Of particular concern are the updates to licensing of fire protection systems technicians, which deviate from the national norms. The GRC submitted comments to the TAG that will be reviewed in the fall of 2023. The GRC is pushing for a return to the requirements of the 2018 State Fire Code for pre-engineered systems, which matches most other states.

Virginia is also in the early stages of updating their fire code. FEMA GRC is engaging with the Virginia Building Code Officials Association (VBCOA) and other groups to improve safety in buildings by requiring extinguisher installation throughout buildings in accordance with the national model codes, including the ICC International Fire Code (IFC). Currently the Virginia Fire Code allows a reduction in safety for certain buildings with regards to portable fire extinguishers, which deviates from most other states. FEMA is pushing for adoption of the latest edition of the IFC, which requires extinguishers throughout buildings.

NFPA has announced the next revision of NFPA 10, *Standard for Portable Fire Extinguishers*. NFPA set a deadline of June 1 for Public Input and received well over 100 proposed changes. The NFPA Technical Committee is scheduled to meet October 31 – November 2, 2023. The committee will review the proposals and develop a draft revision of the standard. The next edition of NFPA 10 will be the 2026 edition. Brooks has members on the committee and will participate in the revision process. ✦

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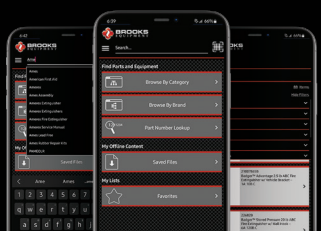

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