NEW YORK CITY FIRE DEPARTMENT

Notice of Public Hearing and Opportunity to Comment on Proposed Rule

What are we proposing? The Fire Department is proposing a new rule, Section 608-01 of Title 3 of the Rules of the City of New York, entitled "Outdoor Stationary Storage Battery Systems," that would establish standards, requirements and procedures for the design, installation, operation and maintenance of outdoor stationary storage battery systems that use various types of new energy storage technologies, including lithium-ion, nickel-cadmium, nickel metal hydride and flow batteries.

When and where is the hearing? The Fire Department will hold a public hearing on the proposed rule. The public hearing will take place at 11:00 a.m. on Thursday, May 30, 2019. The hearing will be held in the Fire Department Auditorium at 9 MetroTech Center, Brooklyn, NY 11201.

How do I comment on the proposed rule? Anyone can comment on the proposed rule by:

- **Website -** You can submit comments to the Fire Department through the NYC rules website at http://rules.cityofnewyork.us, or on the "FDNY Rules" page of the Fire Department's website, http://www1.nyc.gov/site/fdny/codes/fire-department-rules/fire-dept-rules.page.

- **Mail -** You can mail written comments to Code Development Unit, Bureau of Fire Prevention, New York City Fire Department, 9 MetroTech Center, Room 3N2, Brooklyn, NY 11201.

- **Speaking at the hearing -** Anyone who wants to comment on the proposed rule at the public hearing must sign up to speak at the hearing. The time that you can speak may be limited.

Is there a deadline to submit written comments? Yes, written comments must be submitted by Thursday, May 30, 2019.

What if I need assistance to participate in the hearing? You must notify the Bureau of Fire Prevention if you need a sign language interpreter or other reasonable accommodation for a disability at the hearing. Write to us at the address above or telephone us at (718) 999-2042. Advance notice is requested to allow sufficient time to arrange the accommodation. Please notify us by Friday, May 10, 2019.

The Fire Department Auditorium is wheelchair accessible (use the MetroTech Commons entrance).

Can I review the comments made on the proposed rule? You can review the comments made online on the proposed rule by going to the website at http://rules.cityofnewyork.us. A few days

after the hearing, a record of the hearing and copies of the written comments will be available to the public at the Bureau of Fire Prevention.

What authorizes the Fire Department to make this rule? Section 1043(a) of the New York City Charter, and Sections FC 102.6.3 and 102.8 of the New York City Fire Code (Title 29 of Administrative Code of the City of New York) authorize the Fire Department to propose this rule.

Where can I find the Fire Department rules? The Fire Department rules are codified in Title 3 of the Rules of the City of New York and can be viewed on the Fire Department's website at http://www.nyc.gov/fdny or at http://rules.cityofnewyork.us.

What laws govern the rulemaking process? The Fire Department must meet the requirements of Section 1043 of the New York City Charter when creating or changing rules. This notice is made according to the requirements of Section 1043(b) of the New York City Charter. The proposed rule was included in the Fire Department's FY2019 regulatory agenda.

Statement of Basis and Purpose of Proposed Rule

The Fire Department proposes this rule to establish standards, requirements and procedures for the design, installation, operation and maintenance of outdoor stationary storage battery systems that use various types of new energy storage technologies, including lithium-ion, flow, nickel-cadmium and nickel metal hydride batteries. The proposed rule would not govern indoor battery installations.

Background and Purpose

In April 2018, a working group coordinated by the City University of New York and the New York State Energy Research and Development Agency, in which the Fire Department participated, issued the first comprehensive set of guidelines for installing outdoor lithium-ion energy storage systems in New York City, to create a pathway for safe widespread use of lithium-ion stationary storage battery systems. This proposed rule would implement the working group's guidelines through fully-developed design and installation requirements and emergency management procedures for outdoor stationary storage battery systems.

This proposed rule also seeks to address the fire safety concerns associated with new battery technologies by setting testing standards and establishing an equipment approval process for manufacturers. Establishing testing standards, and in particular, requiring full-scale testing of battery system components and pre-engineered products, will enable manufacturers to identify fire safety issues and eliminate them or engineer mitigating measures in the design. The evaluation of the performance of battery system components or products in this manner will also allow the Fire Department to eliminate or expedite its approval process for specific installations. Equipment approvals will allow developers and installers to select products that are already approved for New York City use, with or without conditions or limitations.

Evolution of Battery Use and Technology

Stationary storage battery systems are commonly used in office buildings and other commercial buildings to provide emergency or standby power for life safety systems, or uninterruptible power for business operations. The storage batteries commonly used for these applications are lead-acid batteries similar to those found in automobiles, the science and safety of which is well-understood.

The movement to replace fossil fuels with alternative energy sources to address global environmental concerns has prompted the rapid development of new energy storage technologies. In recent years, new storage battery technology has been developed for large-scale power uses, such as storing power for general building use. The batteries can be charged overnight or during other low-demand periods, and provide building power during the daytime. Additionally, stationary storage batteries can be used to store power generated by rooftop solar panel installations and other local, small-scale energy generating systems. The power generated by these systems, when not needed on site, can supply power to the public utility's power grid.

Because of their energy density (high-energy generation considering the battery's size and weight), lithium-ion batteries are increasingly being used in a wide range of applications, including consumer products. However, lithium-ion batteries are subject to thermal runaway, which occurs when the heat generated by a malfunctioning energy cell or module causes others to fail, potentially generating intense fires and fires that reignite after being extinguished. Various highly-publicized incidents have illustrated the fire safety concerns associated with lithium-ion batteries. In addition to lithium-ion, the new stationary storage battery technology includes nickel-cadmium, nickel metal hydride and flow batteries. This rule would apply to these technologies as well.

Testing and Listing Standards

The Fire Department has been actively engaged for several years in the development of appropriate standards for stationary storage battery systems. Working with national standard-making organizations, nationally-recognized testing laboratories and Federal, State and City agencies, the Fire Department has advocated for the testing of new technologies that would enable the Fire Department and other regulatory agencies to fairly assess, in a scientific manner, any potential hazards associated with the new technologies.

The proposed rule requires the use of the current edition of the Underwriters Laboratories Test Method 9540A for full-scale testing, but the Fire Department is aware that these testing standards, like the technologies themselves, are still in development. The proposed rule acknowledges the evolving standards by specifying the latest listing and testing standards, but authorizing the Fire Department to accept later editions or other standards that address the Fire Department's fire safety concerns. Also under development is a new listing standard that will be used to establish listings with installation conditions based on test data. The proposed rule anticipates that when such listing standard is developed, and approved by the Fire Department and the Department of Buildings, it will replace the existing listing and testing standards and the

Fire Department's equipment approval process, and supersede required separation distances to the extent addressed in the new listing.

The Fire Department specifically invites public comment, including technical comment, about the full-scale testing standard and other standards adopted in this proposed rule.

Proposed Regulatory Requirements

The proposed rule would regulate outdoor stationary storage battery systems based on their technology and size. Table 1 establishes proposed thresholds for small, medium or large outdoor stationary storage battery systems. The size of the stationary storage battery system is based on the energy storage/generating capacity of such system, as rated by the manufacturer, and includes any and all storage battery units operating as a single system.

Table 2 lists the compliance requirements in the proposed rule and indicates, in a readily accessible format, the requirements applicable to each size, and in some cases type, of battery system.

The fire safety regulations in the proposed rule include the following requirements:

- Permits. The proposed rule would require a Fire Department permit for medium and large outdoor stationary storage battery systems. Operational permits ensure that the Fire Department and its firefighting force are aware of the location of the stationary storage battery systems and can conduct periodic inspections as the Fire Department determines appropriate.

- Supervision. The proposed rule would require that all outdoor stationary storage battery systems be under the general supervision of a trained and knowledgeable person holding a Fire Department Certificate of Fitness. The Fire Department anticipates that installers or other persons associated with the design or installation of the stationary storage battery system would be the persons qualified to supervise such systems.

  A Certificate of Fitness requirement would help ensure that installers and other businesses involved in stationary storage battery systems – who may be new to New York City – are familiar with New York City regulatory requirements, and the Certificate of Fitness holder can serve as a point of contact with the Fire Department. The proposed rule would require the Certificate of Fitness holder to assist the Fire Department in any emergency involving or affecting the stationary storage battery system that the Certificate of Fitness holder supervises, including responding to the incident location in a timely manner to confirm that the stationary storage battery system is in good working order, or to mitigate the condition and decommission the stationary storage battery system. The proposed rule anticipates that the required emergency management plan would be developed by manufacturers, installers and, in some cases, property owners, to address how such situations would be handled.

Certificates of Fitness are obtained by studying the online study materials applicable to the particular certificate and submitting to administration of a computerized examination at Fire Department Headquarters. Test results are immediately available, and if a passing score is achieved, the certificate is issued on the spot. The fee for most Certificates of Fitness is $25 for a 3-year period.

The Fire Department specifically invites public comment as to how outdoor stationary storage battery systems are likely to be managed, maintained and monitored once installed, and the category of persons who would be best qualified and available to provide the assistance that the Fire Department may require in the event a seriously malfunctioning stationary storage battery system necessitates a Fire Department response.

- Multiple battery systems. The proposed rule would require Fire Department review of multiple outdoor stationary storage battery systems on a single premises to ensure that the fire safety requirements for larger stationary storage battery systems are not being circumvented by a number of smaller systems.

- Mobile battery systems. Stationary storage battery systems are typically fixed, not portable. However, stationary storage battery systems can be mounted on trailers and towed to locations, in the same way as air compressors, diesel-fueled emergency generators, and other mobile power and heating trailers. The proposed rule would allow mobile stationary storage battery systems and make appropriate adjustments in the approval and permitting process.

- Installation approvals. It is anticipated that only large stationary storage battery systems will require site-specific installation approvals. The proposed rule sets forth the information that will be required for such applications, including any related Department of Buildings applications, Fire Department equipment approvals for stationary storage battery units or components, and site plans.

- Commissioning/decommissioning. The proposed rule would require that outdoor stationary storage battery systems be installed (commissioned) or removed (decommissioned) only by trained and knowledgeable persons holding a Fire Department Certificate of Fitness. The Fire Department anticipates that these will be the same businesses and individuals who will be responsible for maintaining the system once installed and who will be required to obtain a Certificate of Fitness.

  The proposed rule would require notification to the Fire Department in connection with the commissioning and decommissioning of these outdoor stationary storage battery systems, so Fire Department firefighters or other representatives can, if they wish, familiarize themselves with these installations. The removal of any stationary storage battery system experiencing abnormal temperatures or gas emission readings as a result of physical damage, exposure to fire or other cause of failure, would have to be coordinated with the Hazardous Materials Unit of the Fire Department's Bureau of Operations.

- Design and installation requirements. The proposed rule sets forth general design and installation requirements, including Fire Department access and water supply, and separation distances from streets, building openings, overhead power lines, infrastructure and other sensitive locations. The proposed rule would authorize the Fire Department to reduce separation distances if the full-scale testing results show minimal hazards, or increase them if there are hazards that have not been addressed by the manufacturer in engineering of the stationary storage battery system.

  The Fire Department anticipates that medium and large outdoor stationary storage battery systems will be housed in containers and other enclosures. Malfunctioning stationary storage battery systems can generate flammable gases and the enclosures in which they are housed could allow these gases to collect and reach dangerous levels. Accordingly, the proposed rule would require that the enclosures be designed with fire and gas detection systems and other fire protection systems, explosion protection and a manual exhaust system for firefighter use.

  The Fire Department specifically invites public comment on the design and installation requirements for enclosures, and whether the rule needs to address the design and installation of other products developed for outdoor stationary storage battery systems.

- Rooftop installations. The proposed rule allows the installation of stationary storage battery systems on building rooftops, but includes requirements designed to address the fire safety concerns associated with rooftop installations.

- Remote monitoring and reporting. The Fire Department understands that all outdoor stationary storage battery systems will be designed with a battery management system (BMS) that will be remotely monitored on a 24/7 basis. The proposed rule would require such remote monitoring to ensure timely notifications to the Fire Department, Certificate of Fitness holder and manufacturer of the battery if the stationary storage battery system exhibits abnormal behavior indicative of a serious malfunction.

  The Fire Department specifically invites public comment on the business arrangements among the manufacturer, installer and property owner with respect to the monitoring of battery management systems and management of emergencies affecting outdoor stationary storage battery systems.

- Emergency management plan and technical assistance. The proposed rule would require that the property owner, manufacturer and/or installer develop an emergency management plan or protocol that includes procedures for notifications, technical assistance and response to the incident location in the event of an emergency involving or affecting an outdoor stationary storage battery system.

- Signage. The proposed rule would require detailed signage indicating the type of stationary storage battery system, providing emergency contact information, and other information at the fire department (hose) connection, public utility connection or other conspicuous location. The signage must also indicate whether the battery system is

connected to a public utility power grid, such that its shut-down could have widespread or power grid impacts.

- Maintenance. The proposed rule would require an annual inspection of the outdoor stationary storage battery system by the Certificate of Fitness holder. The proposed rule also clarifies that the replacement of battery components with different battery technologies or chemistries would constitute an alteration of the system that must be submitted for Fire Department review and approval in accordance with the requirements of the proposed rule.

- Recordkeeping. The proposed rule would require that records of the installation, maintenance and removal of the outdoor stationary storage battery system and associated equipment must be maintained by the Certificate of Fitness holder and/or the property owner.

The entire proposed rule is underlined, indicating that it is a new rule.

"Shall" and "must" denote mandatory requirements and may be used interchangeably in the rules of this Department, unless otherwise specified or unless the context clearly indicates otherwise.

Section 1. Chapter 6 of Title 3 of the Rules of the City of New York is proposed to be amended by adding a new section, §608-01, to read as follows:

§608-01 Outdoor Stationary Storage Battery Systems

(a) **Scope.** This section governs the design, installation, operation and maintenance of outdoor *stationary storage battery systems* for all energy storage uses, including *stationary storage battery systems* installed on a mobile trailer (or other form of mobile installation). This section does not govern the design, installation, operation and maintenance of indoor *stationary storage battery systems* or *stationary storage battery systems* specifically designed and used for an emergency, standby or uninterruptible power supply.

(b) **Definitions.** The following terms shall, for purposes of this section and as used elsewhere in the *rules*, have the meanings shown herein:

Flow battery. A storage battery that stores and generates an electrical current by ion exchange through a membrane separating liquid electrolytes.

Lead acid battery. A storage battery that is comprised of lead electrodes immersed in sulfuric acid electrolyte, including vented (flooded) or valve regulated lead acid (VRLA) batteries, as those terms are defined in FC602.1.

Lithium-ion (Li-ion) battery. A lithium-ion battery, as that term is defined in FC602.1.

Nickel cadmium (Ni-Cd) battery. A *nickel cadmium battery*, as that term is defined in FC602.1.

Nickel metal hydride (NiMH) battery. An alkaline storage battery in which the positive active material is nickel oxide, the negative active material is a hydrogen-absorbing alloy, and the electrolyte is potassium hydroxide.

Stationary storage battery system. A rechargeable electrochemical energy storage system, consisting of one or more interconnected storage batteries, inverters and other electrical equipment, designed as a stationary installation (or mounted to a trailer for mobile use) to provide electrical power. *Stationary storage battery systems* typically include associated fire protection, explosion mitigation, ventilation and/or exhaust systems.

Storage battery unit. A storage battery system in the configuration in which it was tested and *listed* to Underwriters Laboratories Standard 9540 (UL Standard 9540).

(c) **General Provisions**

(1) **Applicability.** This section supplements FC608 by addressing *stationary storage battery system*s that are installed outdoors for energy storage uses. Rooftop installations are deemed outdoor installations solely for purposes of this section. The design and installation of *stationary storage battery systems* shall also comply with the requirements of the *Department of Buildings*.

(2) **Battery system size thresholds.** *Stationary storage battery systems* are classified by size as small, medium or large for each type of battery technology, as set forth in Table 1 of this section. The size of the *stationary storage battery system* is based on the energy storage/generating capacity of such system, as rated by the manufacturer, and includes any and all storage battery units operating as a single system. Table 1 is not applicable to multiple battery systems operating independently at a single premises, which are subject to R608-01(c)(9).

Table 1
Stationary Storage Battery System Size Thresholds

Battery Technology	**Aggregate Rated Energy Capacity**		
	Small	**Medium**	**Large**
Lead Acid Battery	≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
Ni-Cd Battery	≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
NiMH Battery	≤70 kWh	>70 kWh and ≤ 500 kWh	> 500 kWh
Li-ion Battery	≤20 kWh	>20 kWh and ≤ 250 kWh	> 250 kWh
Flow Battery	≤20 kWh	>20 kWh and ≤ 500 kWh	> 500 kWh

(3) **Battery system compliance requirements.** *Stationary storage battery systems* shall comply with all requirements of this section applicable to the type of installation, as specified in Table 2.

Table 2
Stationary Storage Battery System Compliance Requirements

Section	Compliance Requirement	Small	Medium	Large
(c)	**General Provisions**			
(c)(4)	Permit	No	Yes	Yes
(c)(5)	Supervision (Certificate of Fitness)	Yes	Yes	Yes
(c)(6)	Obligations of Owner and Operator	Yes	Yes	Yes
(c)(7)	Listing and Full-Scale Testing Standards			
(c)(7)(A)	• Listing			
	o *Lead Acid Battery*	Yes	Yes	Yes
	o *Ni-Cd or NiMH Battery*	Yes	Yes	Yes
	o *Li-Ion Battery*	Yes	Yes	Yes
	o *Flow Battery*	Yes	Yes	Yes
(c)(7)(B)	• Full-Scale Testing			
	o *Lead Acid Battery*	No	No	No[g]
	o *Ni-Cd Battery*	No	No	No[g]
	o *NiMH Battery*	No	No	No[g]
	o *Li-Ion Battery*	Yes	Yes	Yes
	o *Flow Battery*	No	No	No[g]
(c)(8)	• Manufacturer's Requirements	Yes	Yes	Yes
(c)(9)	• Multiple Battery System Approval	No[a]	Yes	Yes
(c)(10)	• Mobile Battery Systems	No[b]	Yes	Yes
(d)	• Equipment Approval	Yes[b]	Yes[b]	Yes[b,h]
(e)	• Installation Approval	No[b]	No[f]	Yes
(f)	• Commissioning and Decommissioning	No[c]	Yes	Yes
(g)	**General Design and Installation Requirements**			
(g)(1)	• Location and Construction	Yes	Yes	Yes
(g)(2)	• Remote Monitoring	Yes	Yes	Yes
(g)(3)	• Electrical Components	Yes	Yes	Yes
(g)(3)(C)	o Secondary Power	No	Yes	Yes
(h)	**Enclosure Design and Installation Requirements**			
(h)(1)	• Human Occupancy Prohibited	N/A	Yes	Yes

(h)(2)	• Racks	N/A	Yes	Yes
(h)(3)	• Fire Extinguishing System	No[d]	No[e]	Yes
(h)(4)	• Explosion Mitigation	No[d]	No[e]	Yes
(h)(5)	• Fire Detection	No[d]	Yes	Yes
(h)(6)	• Gas Detection			
	o *Lead Acid Battery*	Yes[e]	Yes	Yes
	o *Ni-Cd and NiMH Battery*	Yes[e]	Yes	Yes
	o *Li-Ion Battery*	No	No[d]	No[d]
	o *Flow Battery*	Yes[e]	Yes	Yes
(h)(7)	• Detector Alarm Notification	No[c]	Yes	Yes
(h)(8)	• Ventilation System	No[d]	No[e]	Yes
(h)(9)	• Smoke/Gas Purge System	No[d]	No[e]	Yes

(i)	**Operational and Maintenance Requirements**			
(i)(1)	• Remote Monitoring of Battery Management System and Reporting	Yes	Yes	Yes
(i)(2)	• Central Station Monitoring of Fire Protection System	N/A[d]	Yes	Yes
(i)(3)	• Remote Monitoring at Constantly Attended On-Site Location	No	No	No
(i)(4)	• Technical Assistance	Yes	Yes	Yes
(i)(5)	• Emergency Management	Yes	Yes	Yes
(i)(6)	• Signage	Yes	Yes	Yes
(i)(7)	• Maintenance			
(i)(7)(A)	o Periodic Inspection	No	Yes	Yes
(i)(7)(B)	o Replacement Components	Yes	Yes	Yes
(i)(7)(C)	o Combustible Waste	Yes	Yes	Yes
(i)(7)(D)	o Storage of Combustible Materials	Yes	Yes	Yes
(j)	**Recordkeeping**	Yes	Yes	Yes

a. Except for multiple small battery systems installed in a single enclosure or as part of a single installation.

b. Except for battery systems tested and *listed* by a nationally recognized testing laboratory with installation conditions, as set forth in R608-01(c)(7)(C), or other *approved listing* based on *approved* test data.

c. Except for coordination of removal and transportation of small battery systems experiencing abnormal temperature or gas emission readings, as set forth in R608-01(f)(3)(B).

d. Unless required as a condition of equipment approval based on full-scale testing. The *Department* will assess the results of the full-scale testing to determine whether there are any hazards that are not resolved or mitigated by the equipment or installation design and, if the installation is approved, prescribe appropriate safeguards.

e. Required for equipment approval, as an element of the storage battery unit design, not as part of a battery system enclosure.

f. Limited post-installation review by inspection unit for *Department* permit issuance only.

g. *Approved* test data is required for explosion mitigation measures. If no other *approved* test data is available, test data from UL Test Method 9540A testing will be required.

h. Except project-specific installation designs. Large installations that utilize full-scale tested and *Department*-approved *storage battery units* in non-standard configurations or other project-specific designs may be field-tested in accordance with UL Standard 9540 or other *approved* standard.

(4) **Permit.** When required by Table 2 of this section, a *permit* is required to maintain and operate a *stationary storage battery system*.

(5) **Supervision.** A *stationary storage battery system* shall be operated and maintained under the *general supervision* of a person holding a *certificate of fitness*, who shall:

(A) be trained and knowledgeable in the installation and operation of the battery system, such as a person engaged in the design or installation of such systems;

(B) possess the manufacturer's installation and operating specifications for each battery system and any associated fire protection systems;

(C) immediately report any emergency condition affecting a battery system to the *Department*; and

(D) provide technical assistance to the *Department* in accordance with R608-01(i), and arrange for technical assistance from the manufacturer or provide contact information with which the *Department* can obtain such technical assistance.

(6) **Obligations of owner and operator.** Both the owner of the premises at which the *stationary storage battery system* has been installed, and the business responsible for the battery system's operation, if any, are responsible for compliance with all battery system installation, operational and maintenance requirements, including the lawful and proper removal and disposal of the battery system.

(7) **Listing and full-scale testing standards.** The following standards are applicable to the *listing* and full-scale testing of *stationary storage battery systems*. The *Department* may accept battery systems *listed* and tested to later editions of these standards when necessary to address evolving standards applicable to a rapidly developing technology.

(A) **Listing.** All *stationary storage battery systems* shall be tested and *listed* by a nationally recognized testing laboratory to the following standards:

(*1*) Underwriters Laboratories (UL) Standard 1741 (2010 edition), entitled "Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources;"

(*2*) Underwriters Laboratories (UL) Standard 1973 (2018 edition), entitled "Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications;" and

(*3*) Underwriters Laboratories (UL) Standard 9540 (2016 edition), entitled "Energy Storage Systems and Equipment."

(B) **Full-scale testing.** When full-scale testing is required by this section, *stationary storage battery systems* shall be tested to Underwriters Laboratories (UL) Test Method 9540A (2018 edition), entitled "Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems," or other *approved* standard or test data.

(C) **Listing with installation conditions.** Upon approval by the *Department* and the *Department of Buildings* of a *listing* standard that is used to establish *listings* with installation conditions based upon test data, such *approved listing* standard shall replace the existing listing and testing standards set forth in R608-01. The *approved listing* standard and *listings* shall supersede the equipment approval process set forth in R608-01 and, to the extent addressed in such *approved listing*, the required separation distances.

(8) **Manufacturer's requirements**. *Stationary storage battery systems* shall be designed, installed, operated and maintained in compliance with the manufacturer's specifications.

(9) **Multiple battery systems**. Installation of more than one *stationary storage battery system* on a single premises requires *Department* review and approval and is subject to such additional or alternative requirements as the *Department* may impose in the interests of public safety. Multiple small *stationary storage battery systems* are not subject to this requirement if they:

(A) are not part of a single installation or installed in a single enclosure; and

(B) operate independently of each other and are not interconnected with other small, medium or large battery systems.

(10) **Mobile battery systems**. *Stationary storage battery systems* installed on a trailer or otherwise designed to be moveable for use at multiple locations shall be designed, installed, operated and maintained in compliance with the provisions of this section, except as follows:

(A) Installation approval (R608-01(e)) is not required. The equipment approval application submitted to the *Department* pursuant to R608-01(d) shall include information and documentation relating to the design of the trailer and the installation of the battery system. Any limitations on the use of mobile battery systems will be addressed through conditions on the equipment approval.

(B) Compliance with commissioning and decommissioning requirements (R608-01(f)) is not required, except that decommissioning of a malfunctioning battery system shall be coordinated with the *Department* in accordance with R608-01(f)(3)(B).

(d) **Equipment Approval.** When required by Table 2 of this section, the design of each *storage battery unit* shall be approved by the *Department*. The manufacturer of the *storage battery unit* shall obtain a *certificate of approval* for such unit in accordance with FC112, R112-01 and this section. The application for such equipment approval shall include the following information and documentation and such other information and documentation as the *Department* may require:

(1) Any application filed with the *Department of Buildings*; and

(2) The manufacturer's specifications and ratings, listing documents (including failure mode/effects analysis and, when required, complete UL Test Method 9540A test data or other *approved* data) for, and photographs of:

(A) each type of storage battery unit;

(B) the cabinet, container or other enclosure, and, if the installation consists of more than one storage battery unit, the arrangement of the storage batteries, including any rack storage (with seismic support criteria) and aisle dimensions;

(C) battery management system (BMS) operation;

(D) any fire extinguishing system intrinsic to the unit or enclosure;

(E) any fire detection and gas detection systems intrinsic to the unit or enclosure; and

(F) any ventilation and/or exhaust system intrinsic to the unit or enclosure.

(e) **Installation Approval**. When required by Table 2 of this section, the design of each *stationary storage battery system* installation shall be approved by the *Department*. The *owner* shall obtain *Department* approval of the design and installation documents in accordance with this section. The application for installation approval shall include the

following information and documentation and such other information and documentation as the *Department* may require:

(1) Any application filed with the *Department of Buildings*;

(2) The *Department* equipment approval for each *battery system unit* (or a separate application for such equipment approval);

(3) A site plan containing the following information:

(A) Exact location of the *stationary storage battery system* installation; including location of access panel or enclosure entrance(s);

(B) Surrounding public streets, fire apparatus access roads and pedestrian walkways;

(C) All buildings and structures on the premises, identified by occupancy group and construction type, and any measures to mitigate the impact of storage battery or battery system on adjoining buildings or structures or other site-specific hazard mitigation, including those required by a UL Standard 9540 hazard mitigation analysis.

(D) Any walls or fencing enclosing the installation or the premises on which it is located.

(E) All transportation and utility infrastructure, including electrical power lines, within 250 feet of the installation.

(F) Location and content of signage.

(G) Location and type of other *stationary storage battery systems* located on the premises or within 50 feet of the proposed installation (if 50 feet extends to other premises, as determined by visual inspection of the outdoor space or reasonable inquiry of the owner).

(H) Emergency shutdown procedures, including the location of the *stationary storage battery system* emergency shut down control; and

(4) A commissioning and decommissioning plan, including disposal procedures, in accordance with R608-01(f).

(f) **Commissioning and decommissioning.** *Stationary storage battery systems* shall be commissioned (installed and activated for use) and decommissioned (deactivated from use and removed from the premises) in accordance with the following procedures:

(1) **Commissioning.** A *stationary storage battery system* shall be commissioned by a trained and knowledgeable person in accordance with manufacturer's specifications. Upon completion of the installation, the installer shall confirm that the battery system is in good working order and operating in accordance with manufacturer's specifications.

(2) **Decommissioning.** The *owner*, manufacturer or other party responsible for removal and disposal of the *stationary storage battery system* shall ensure that the battery system is lawfully decommissioned, transported and disposed of in accordance with *USDOT* hazardous materials regulations and other applicable laws, rules and regulations. The *owner*, manufacturer or installer of *stationary storage battery systems* shall have an emergency management plan or protocol that includes procedures for notifications and technical assistance in accordance with R608-01(i)(4) and (5) and all other actions necessary for mitigation and decommissioning (or restoration to normal operation).

(3) **Notice to Department**. The *owner* shall notify the *Department* of the commissioning or decommissioning of a *stationary storage battery system* and give *Department* representatives the opportunity to attend the commissioning or decommissioning to monitor the process; familiarize themselves with a commissioned battery system's installation and operation; and/or confirm the proper decommissioning of a battery system in accordance with the *approved* decommissioning plan.

(A) **Regular procedure.** Except as otherwise provided in R608-01(f)(3)(B), the *owner* shall notify the *Department* by emailing the date, location, type and size of the battery system installation to tech.mgt@fdny.nyc.gov not later than two (2) business days prior to the scheduled action. No confirmation is required and the scheduled action can proceed in the *Department*'s absence. If the action is rescheduled, amended notice shall be given to the *Department* in as timely a manner as circumstances allow.

(B) **Decommissioning of malfunctioning battery system**. The removal and transportation of any battery system that has given abnormal temperature or gas emission readings as a result of physical damage, exposure to fire or other actual or potential cause of damage, shall be coordinated with the Hazardous Materials Unit of the *Department's* Bureau of Operations, who may send representatives to monitor the decommissioning process. The Hazardous Materials Unit shall be notified two (2) business days prior to the scheduled action, or in as timely a manner as circumstances allow, by calling the *Department* Communications Office in the borough in which the battery system is located.

(g) General Design and Installation Requirements. When required by Table 2 of this section, *stationary storage battery systems* shall be designed and installed in accordance with the following requirements:

(1) **Location and construction.** *Stationary storage battery systems* shall be located and constructed in accordance with the following requirements:

(A) **Outdoor location.** *Stationary storage battery systems* shall be located outdoors. This includes rooftops when authorized by this section. Medium and large battery systems shall not be installed in enclosed areas without direct access from a public street, or fire apparatus access road, unless full-scale testing demonstrates intrinsic safety, or hazard mitigation measures that the *Department* determines to be appropriate for the particular location are provided.

(B) **Fire Department access and water supply.** Where feasible, a direct, unobstructed pathway shall be provided from the battery system installation to the public street or fire apparatus access road on which the premises fronts. *Stationary storage battery systems* located more than 250 feet from a hydrant shall be provided with a private hydrant or other *approved* water supply for firefighting operations in accordance with FC508.

(C) **Separation distances**. *Stationary storage battery systems* shall be located a minimum of 10 feet from the following exposures, except where lesser or greater distances are required by the equipment approval or installation approval based on full-scale testing data that indicate that a battery system fire will or will not adversely impact one or more of the following exposures:

(*1*) Lot lines;

(*2*) Public streets, fire apparatus access road, public walkways and other public ways;

(*3*) Any vehicle parking;

(*4*) Any building entrance, openable window, or ventilation intake;

(*5*) Any exit discharge or other means of egress from a building or outdoor area;

(*6*) Any outdoor hazardous materials or combustible materials storage facility or area;

(*7*) Any outdoor storage facility or area for high-piled combustible materials or other combustible items;

(*8*) Overhead power lines or other aboveground electrical installation, measured from the boundary of the utility easement or, if there is no easement, from the vertical plane of the installation at its widest point; and

(*9*) Any public utility or transportation infrastructure.

(D) **Rooftop locations.** *Stationary storage battery systems* may be located on a building rooftop, subject to the following requirements:

(*1*) The building roof covering or roofing system shall be noncombustible within five (5) feet of the battery system installation.

(*2*) Rooftop battery system installations, including structural, electrical or other associated equipment, shall not obstruct the rooftop access and clear path required by FC504.4 for buildings 100 feet or less in height.

(*3*) There shall be access to the rooftop from a building stairway, or other means of rooftop access authorized by the *Building Code.* A safe, unobstructed path must be provided from the bulkhead door or other point of entry to the entrance(s) to the battery system enclosure or to the service/access panel (if any).

(*4*) Any dunnage or other structural support for the battery system installation shall have a minimum one (1) hour fire rating for small and medium battery systems and two (2) hours for large battery systems.

(*5*) On rooftops of buildings provided with a standpipe, a minimum of two (2) standpipe hose outlets shall be provided within the building bulkhead, in accordance with FC912, at an *approved* distance from the *stationary storage battery system* installation sufficient to ensure safety of firefighting operations. On rooftops of buildings that do not have a standpipe, an *approved* water supply source shall be provided for firefighting operations. If a standpipe is provided for the battery system installation, the fire department connections shall be identified by durable signage or markings conspicuously posted at street level in accordance with FC912.

(*6*) Rooftop installations shall comply with the separation distances set forth in R608-01(g)(1)(c) for means of egress; hazardous materials or combustible materials storage facility or area; overhead power lines or other aboveground electrical installation; public utility or

transportation infrastructure; and other *stationary storage battery system* installations.

(*7*) Rooftop installations shall be located a reasonable distance (but not less than 10 feet) from the bulkhead entrance door or other rooftop access location pursuant to R608-01(g)(1)(D)(3).

(8) Valve-regulated lead-acid (VRLA) and flow batteries may not be installed on rooftops unless the applicant demonstrates to the satisfaction of the *Department* that the hazardous materials used in such systems can be safely stored and used on a rooftop, and the application adequately addresses leak detection, spill containment and the movement of such *hazardous materials* through the building.

(E) **Physical Protection.** *Stationary storage battery system* installations shall be protected from damage in accordance with the following requirements:

(*1*) **Temperature.** The storage battery or battery system shall be designed for operation throughout the entire expected range of ambient temperature, in accordance with manufacturers' specifications, or provided with appropriate protection from damage from extreme ambient temperatures.

(*2*) **Vehicle impact protection**. Where the battery system is subject to impact by a motor vehicle or other motorized equipment, such as a fork lift or other powered industrial trucks, vehicle impact protection shall be provided in accordance with FC312.

(*3*) **Security**. The battery system installation shall be secured against unauthorized entry. All battery system enclosures shall be securely locked and, where appropriate, safeguarded by a chain link fence or other *approved* barrier.

(2) **Remote monitoring.** All *stationary storage battery systems* shall be designed to transmit data regarding battery system status and temperature to a remote monitoring facility.

(3) **Electrical components.** The electrical components of *stationary storage battery systems* shall be designed and installed in accordance with the following requirements:

(A) **Compliance with testing standard.** The electrical components of the battery system shall comply with UL Standard 9540.

(B) **Operating conditions.** The electrical components of the battery system shall be designed to operate safely during normal battery system operating conditions.

(C) **Secondary power.** A separate source of electrical power shall be provided for battery system controls and safety functions, including detection, ventilation and smoke/gas purge systems. Such secondary power can be supplied from any independent power source. If the secondary power supply is an emergency power system designed in accordance with the *Building Code*, it shall be capable of supplying secondary power for a duration of two hours.

(D) **Emergency shut down.** An emergency shut down control (e-stop), in the form of a red button or other *approved* design, designed to shut down all *stationary storage battery system* operations (without affecting the fire protection systems and other safety measures required by this section) shall be provided at the fire department connection, if any, utility connection or other *approved*, conspicuous outdoor location on the premises that is accessible to emergency response personnel and is a reasonable distance (but not less than 10 feet) from the *stationary storage battery system* installation. The shut down control shall be secured in a lock box operable by a *citywide standard key* (2642 key) in accordance with FC506. Signage shall be provided as set forth in R608-01(i)(6).

(h) Enclosure Design and Installation Requirements. When required by Table 2 of this section, *stationary storage battery systems* housed in a shipping container or other type of outdoor enclosure (but not a storage battery system housing, except as otherwise provided in R608-01(h)(3)) shall be designed and installed in accordance with the following requirements:

(1) **Human occupancy prohibited.** No *stationary storage battery system* shall be housed in an enclosure used for human occupancy. Access to such an enclosure shall be provided solely for maintenance purposes, including inspection, testing, servicing and repair of the battery system.

(2) **Racks.** *Stationary storage battery systems* may be installed on open racks within enclosures provided that water-based fire extinguishing, explosion mitigation, ventilation and smoke/gas purge systems are provided within the enclosure in accordance with R608-01(h).

(3) **Fire extinguishing system**. An *approved* dry pipe water fire extinguishing system designed and installed in accordance with NFPA Standard 15 (2007 edition), shall be provided in *stationary storage battery system* enclosures. The fire department connections shall be located at an *approved* distance from the *stationary storage battery system* enclosure as to ensure the safety of firefighting operations. An external fire extinguishing system of such design and installation

shall be provided for any large *stationary storage battery system* in an outdoor cabinet or other battery system housing.

(4) **Explosion mitigation**. Explosion mitigation shall be provided for battery system enclosures in accordance with the following requirements:

(A) Deflagration venting. Deflagration venting shall be provided in accordance with NFPA Standard 68 (2007 edition), based on UL Test Method 9540A or other *approved* test data. Such venting shall be provided and designed to vent upwards or other safe location. Vents shall not face toward any exit discharge path from a nearby building or other pedestrian walkway, or any location from which emergency response personnel may access the enclosure.

(B) **Explosion prevention.** The concentration of combustible vapors during abnormal operation may be controlled in accordance with NFPA Standard 69 (2008 edition) if a hazard mitigation analysis, based on full-scale testing or other *approved* test data, indicates that such mitigation measures will be effective in keeping the target *lower flammability limit (LFL)* within the enclosure at or below 25 percent of the *LFL*.

(5) **Fire detection system.** An *approved* automatic fire detection system shall be installed in battery system enclosures in accordance with FC907. System activation shall initiate alarm, shut down and hazard mitigation measures in accordance with R608-01(h)(7).

(6) **Gas detection system.** An *approved* gas detection system shall be installed in battery system enclosures in accordance with FC908. The placement of detectors shall be in accordance with manufacturer's specifications. When the level of flammable gas inside the battery system enclosure exceeds 25 percent of the *LFL*, the gas detection system shall initiate alarm, shut down and hazard mitigation measures in accordance with R608-01(h)(7).

(7) **Detector alarm notification.** Activation of a fire or gas detector in a battery system enclosure shall initiate the following notifications and other actions:

(A) Activate a distinct audible and visible alarm signal at the battery system installation or an *approved* constantly attended on-site location.

(B) Transmit an alarm signal to the *fire alarm system* and thereby to an *approved central station*.

(C) Shut down the battery system, if warranted.

(D) Activate all necessary shut down and hazard mitigation measures of the ventilation system.

(8) **Ventilation system.** An automatic mechanical ventilation system shall be provided for the space within the battery system enclosure in accordance with the *Mechanical Code* and the following design requirements. The ventilation system shall be designed to maintain optimal operating conditions for the *stationary storage battery system* in accordance with manufacturer's specifications or Institute of Electrical and Electronics Engineers (IEEE) Standard 1635/ASHRAE Standard 21 (2012 edition), whichever requires a higher level of protection. The ventilation system shall be intrinsically safe for, and/or explosion protected from, any toxic and flammable gases generated by the battery system during normal operating conditions, and shall be designed to limit the maximum concentration of toxic gases inside the battery enclosure to 25 percent of the *permissible exposure limit (PEL)* for such gases, unless full-scale testing demonstrates that the storage battery unit does not generate toxic gas concentrations in excess of 25 percent of *PEL*.

(9) **Smoke/gas purge system.** A manually-operated purge system designed to exhaust heat, smoke and toxic gases generated by the *stationary storage battery system* during abnormal operating conditions, for use by firefighting personnel, shall be provided for a battery system enclosure. The smoke/gas purge system shall be intrinsically safe and/or explosion protected for any such toxic gases and be designed in accordance with the following requirements:

(A) **Manual operation.** The smoke/gas purge system shall be designed to be manually activated. A manual activation switch shall be installed at the fire department connection, if any; otherwise, near the utility connection or other *approved* location on the premises. The activation switch shall be identified by a conspicuously posted and durable sign that reads: "Battery System Emergency Smoke/Gas Purge." The activation switch shall be secured in a lock box operable by a *citywide standard key* (2642 key) in accordance with FC506.

(B) **Exhaust venting.** The smoke/gas purge system shall vent in a manner that will minimize the risk to surrounding buildings and building occupants, pedestrians, and emergency response personnel. Exhaust vents shall not face toward any exit discharge path from a nearby building or other pedestrian walkway, or any location from which emergency response personnel may access the enclosure.

(i) Operational and Maintenance Requirements. *Stationary storage battery systems* shall be operated and maintained in accordance with this section.

(1) **Remote monitoring of battery management system and reporting.** The *owner* of a *stationary storage battery system* shall arrange for data transmissions from the battery system's battery management system to be continuously monitored (on a 24/7 basis) by a remote monitoring facility staffed by trained and

knowledgeable persons retained by the manufacturer or installer of the battery system. The remote monitoring facility shall, without delay, make the following notifications in the event a battery system installed in New York City exceeds or appears likely to exceed thresholds at which fire, explosion or other serious adverse consequences may result:

(A) Notify the *Department* by calling the Communications Office in the borough in which the battery system is located, to alert the *Department* to the unsafe condition;

(B) Notify the *certificate of fitness* holder responsible for the battery system, in a pre-arranged manner, to alert such individual to be ready to provide technical assistance to the *Department* and/or respond to the incident location in accordance with R608-01(i)(4) and (5); and

(C) Notify the manufacturer of the battery system to make a qualified representative available to provide technical assistance to the *Department* pursuant to R608-01(i)(4).

(2) **Central station monitoring of fire protection systems**. All *fire protection systems* protecting the battery system installation, including any *fire extinguishing system*, and fire and gas detection or other *emergency alarm system* required by this section, shall be monitored by an *approved central station*.

(3) **Constantly attended on-site locations.** Battery systems and *fire protection systems* may be monitored at a constantly attended on-site location, but such monitoring may not substitute for the remote monitoring facility and/or *central station* required by R608-01(i)(1) and (2), unless such substitution is approved in writing by the Technology Management Unit of the *Bureau of Fire Prevention*.

(4) **Technical assistance.** Upon request of the *Department*, both the *certificate of fitness* holder responsible for the battery system and the battery system manufacturer shall make available to the *Department* a representative with technical knowledge of the battery system and its operation. Such representative shall be made available as soon as possible, but in any event within 15 minutes of receipt of the *Department*'s request.

(5) **Emergency management.** Upon request of the *Department*, the *certificate of fitness* holder responsible for the battery system and an authorized representative of the *owner* of the premises upon which the battery system is installed shall respond to the location of the battery installation, as soon as possible but in any event within two (2) hours of notification, to assist the *Department* in addressing a fire or other emergency involving or affecting the battery system, and to take all other actions necessary for mitigation and decommissioning of the battery system (or restoration to normal operation).

(6) **Signage.** When required by Table 2 of this section, the following signs (or equivalent markings) shall be durably posted for each *stationary storage battery system*, at the locations indicated:

(A) **Warning signs.** The following warning signs shall be posted on the exterior of medium and large battery systems or battery system enclosure:

(*1*) "Danger: High Voltage;" and

(*2*) Hazard identification sign complying with NFPA Standard 704 (2007 edition).

(B) **Identification, emergency contact and emergency shut-down signs**. The following signs shall be posted at the fire department connection, if any, utility connection or other *approved*, conspicuous outdoor location on the premises that is accessible to emergency response personnel and that is a reasonable distance (but not less than 10 feet) from the *stationary storage battery system* installation. The signage may be posted within a marked, locked box secured by a *citywide standard key* (2642 key). If the location of the signage would not be readily apparent to emergency response personnel, a sign with large lettering (not less than 3 inches high) shall be posted on or adjacent to the battery installation indicating the location of the following signage:

(*1*) **Permit.** The *permit* for the installation, laminated or otherwise suitably weatherproofed.

(2) **Equipment specifications**. The manufacturer and model number of the battery system and electrical rating (voltage and current).

(*3*) **Installation identification**. A number or other unique identifier by which the *Department* can identify the installation in communications with the remote monitoring facility or attended on-site location.

(4) **Monitoring facility contact information**. A telephone number that can be used to contact the remote monitoring facility responsible for the battery maintenance system.

(5) **Certificate of fitness contact information.** The name and telephone number of the *certificate of fitness* holder responsible for the battery system.

(6) **Emergency shutdown procedures**. Emergency shutdown procedures for the battery energy storage system shall be posted at the battery system emergency shut down (e-stop) control and at

any attended on-site location. The emergency shutdown instructions shall clearly indicate "GRID SUPPORT SYSTEM" in large letters (not less than 2 inches high) if immediate shut down of the battery system could disrupt public utility operations.

(7) Maintenance. The *owner* shall ensure that *stationary storage battery systems* are periodically inspected, tested, serviced and otherwise maintained in accordance with manufacturer's specifications and the requirements of this section by a person trained and knowledgeable in the specific battery system.

(A) **Periodic inspection.** When required by Table 2 of this section, the battery system shall be inspected by the *certificate of fitness* holder on not less than an annual basis to confirm continued compliance with applicable code, *rule* and *permit* requirements, including checking for the presence of required signage and whether any posted information needs to be updated, and confirming that all required systems are in good working order.

(B) **Replacement components.** Any replacement storage battery units or other battery system components shall be designed for the same storage battery technology and/or chemistry and be compatible with the existing battery system installation. In-kind replacement of existing components does not require *Department* review and approval. Replacement of existing components with different battery technologies or chemistries (including the electrolyte chemistry in a flow battery system) or that change the storage/generating capacity or other functionality of a battery system constitutes an alteration of the battery system and shall be submitted for *Department* review and approval, and, as applicable, *Department of Buildings* review and approval, in the same manner as an application for a new *stationary storage battery system* installation.

(C) **Combustible waste.** *Stationary storage battery system* installations shall be kept free from the accumulation of combustible waste and combustible vegetation in accordance with FC304.1.

(D) **Storage of combustible materials.** Combustible materials not required for battery system operation shall not be stored in battery system enclosures.

(j) **Recordkeeping Requirements.** A written record of the following information shall be maintained at the premises or other *approved* location by the *certificate of fitness* holder, and, for medium and large battery systems, by the *owner* or operator of the battery system:

(1) Battery system installation and commissioning;

(2) Battery system maintenance, including all inspections, servicing and repair;

(3) Battery system decommissioning and removal;

(4) Installation and maintenance of battery system fire protection systems, including all inspection, testing, servicing and repair; and

(5) Fires or other incidents involving or affecting the battery system.

608-01 (4/23/19 publication)

NEW YORK CITY LAW DEPARTMENT
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CERTIFICATION PURSUANT TO

CHARTER §1043(d)

RULE TITLE: Review and Approval of Outdoor Stationary Storage Battery Systems

REFERENCE NUMBER: 2018 RG 122

RULEMAKING AGENCY: Fire Department

I certify that this office has reviewed the above-referenced proposed rule as required by section 1043(d) of the New York City Charter, and that the above-referenced proposed rule:

(i) is drafted so as to accomplish the purpose of the authorizing provisions of law;

(ii) is not in conflict with other applicable rules;

(iii) to the extent practicable and appropriate, is narrowly drawn to achieve its stated purpose; and

(iv) to the extent practicable and appropriate, contains a statement of basis and purpose that provides a clear explanation of the rule and the requirements imposed by the rule.

/s/ STEVEN GOULDEN Date: November 29, 2018
Acting Corporation Counsel

NEW YORK CITY MAYOR'S OFFICE OF OPERATIONS
253 BROADWAY, 10th FLOOR
NEW YORK, NY 10007
212-788-1400

CERTIFICATION / ANALYSIS
PURSUANT TO CHARTER SECTION 1043(d)

RULE TITLE: Review and Approval of Outdoor Stationary Storage Battery Systems

REFERENCE NUMBER: FDNY-19

RULEMAKING AGENCY: Fire Department

I certify that this office has analyzed the proposed rule referenced above as required by Section 1043(d) of the New York City Charter, and that the proposed rule referenced above:

i. Is understandable and written in plain language for the discrete regulated community or communities;

ii. Minimizes compliance costs for the discrete regulated community or communities consistent with achieving the stated purpose of the rule; and

iii. Does not provide a cure period because it does not establish a violation, modification of a violation, or modification of the penalties associated with a violation.

/s/ Guenevere Knowles
Mayor's Office of Operations

Date: November 30, 2018