



**Department
of State**

2019 Energy Storage System Supplement

containing amendments to the New York State Uniform Fire Prevention and Building Code

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Introduction

The New York State Uniform Fire Prevention and Building Code (the “Uniform Code”) is formulated by the State Fire Prevention and Building Code Council (the “Code Council”) pursuant to Article 18 of the New York State Executive Law.

The text of the Uniform Code is found in Title 19 of the New York Codes, Rules and Regulations (“19 NYCRR”), Parts 1219 through 1229, and in the publications incorporated by reference in 19 NYCRR Parts 1219 through 1229. The publications incorporated by reference in 19 NYCRR Part 1219 through 1229 include:

The 2015 edition of the *International Residential Code* (second printing), the *International Building Code* (third printing), the *International Plumbing Code* (third printing), the *International Mechanical Code* (third printing), the *International Fuel Gas Code* (third printing), the *International Fire Code* (third printing), the *International Property Maintenance Code* (fourth printing), The *International Existing Building Code* (fifth printing), the *2017 Uniform Code Supplement*, and other standards referenced in 19 NYCRR Parts 1219 through 1229.

This publication, known as the *2019 Energy Storage System Supplement*, amends the Uniform Code to specifically address the installation, operation, maintenance and repair of energy storage systems. This publication regulates the minimum fire safety requirements for new and existing energy storage systems and intends to address the fire prevention, fire protection, life safety and use of energy storage systems.

Arrangement of the 2019 Energy Storage System Supplement

Before applying the requirements of this publication, it is beneficial to understand its arrangement. The *2019 Energy Storage System Supplement* contains amendments to certain publications that have been incorporated by reference into the Uniform Code and is organized as follows:

- **Part 1:** Certain provisions of the *2015 International Residential Code* (the “2015 IRC”) are currently amended by the *2017 Uniform Code Supplement*. Part 1 of this *2019 Energy Storage System Supplement* makes further amendments to the 2015 IRC.
- **Part 2:** Appendix J of the 2015 IRC is currently amended and restated in its entirety by the *2017 Uniform Code Supplement*. Part 2 of this *2019 Energy Storage System Supplement* makes further amendments to Appendix J.
- **Part 3:** Certain provisions of the *2015 International Building Code* (the “2015 IBC”) are currently amended by the *2017 Uniform Code Supplement*. Part 3 of this *2019 Energy Storage System Supplement* makes further amendments to the 2015 IBC.
- **Part 4:** Certain provisions of the *2015 International Fire Code* (the “2015 IFC”) are currently amended by the *2017 Uniform Code Supplement*. Part 4 of this *2019 Energy Storage System Supplement* makes further amendments to the 2015 IFC.
- **Part 5:** Certain provisions of the *2015 International Existing Building Code* (the “2015 IEBC”) is currently amended by the *2017 Uniform Code Supplement*. Part 5 of this *2019 Energy Storage System Supplement* makes further amendments to the 2015 IEBC.

Unless specifically stated, the amendments contained in the *2019 Energy Storage System Supplement* do not replace the amendments contained in the *2017 Uniform Code Supplement* in

any way, and need to be used in conjunction with the amendments contained in the *2017 Uniform Code Supplement*.

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Part 1 – Amendments to the 2015 International Residential Code

For the purposes of applying the 2015 International Residential Code (the “2015 IRC”) in this State, the 2015 IRC, certain provisions of which are currently amended by the *2017 Uniform Code Supplement*, shall be deemed to be further amended in the manner specified in this Part 1.

In addition, Appendix J of the 2015 IRC, which is currently amended and restated in its entirety by Section 2.54 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended in the manner specified in Part 2 of this publication.

1.1 2015 IRC Section R202 (Definitions)

Section R202 of the 2015 IRC, which is currently amended, in part, by Section 2.2 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended by the addition of a definition of the term *energy storage system*, to read as follows:

ENERGY STORAGE SYSTEM. One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

1.2 2015 IRC Section R327 (Energy Storage Systems)

Chapter 3 of the 2015 IRC shall be deemed to be amended by the addition of a new Section R327, to read as follows:

SECTION R327 ENERGY STORAGE SYSTEMS

R327.1 General. *Energy storage systems* installed in *buildings* or *structures* that are subject to the provisions of this code shall be installed and maintained in accordance with Sections R327.2 through R327.11. The temporary use of an owner’s or occupant’s electric powered vehicle as an *energy storage system* shall be in accordance with Section R327.12.

Energy storage system installations exceeding the permitted aggregate ratings in Section R327.5 shall be installed in accordance with Section 608.2 through 608.17.7.7 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

R327.2 Equipment listings. *Energy storage systems* shall be *listed* and *labeled* for residential use in accordance with UL 9540. *Energy storage systems listed* and *labeled* solely for utility or commercial use shall not be used for residential applications.

Exceptions:

1. Where *approved*, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.
2. *Energy storage systems* less than 1 kWh (3.6 megajoules).

R327.3 Installation. *Energy storage systems* shall be installed in accordance with the manufacturer’s instructions and their *listing*.

R327.3.1 Spacing. Individual units shall be separated from each other by at least 3 feet of spacing unless smaller separation distances are documented to be adequate based on large

scale fire testing complying with Section 608.6 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

R327.4 Location. *Energy storage systems* shall only be installed in the following locations:

1. Detached garages and detached *accessory* structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section R302 of this code.
3. Outdoors on exterior walls located a minimum 3 ft. from doors and windows.
4. Utility closets and storage or utility spaces within *dwelling units* and *sleeping units*

R327.5 Energy ratings. Individual *energy storage system* units shall have a maximum rating of 20 kWh. The aggregate rating shall not exceed:

1. 40 kWh within utility closets and storage or utility spaces
2. 80 kWh in attached or detached garages and detached *accessory structures*
3. 80 kWh on exterior walls
4. 80 kWh outdoors on the ground

R327.6 Electrical installation. *Energy storage systems* shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 *listing*. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

R327.7 Fire detection. Rooms and areas in which *energy storage systems* are installed shall be protected by smoke alarms in accordance with Section R314. A heat detector or heat alarm *listed* and interconnected to the smoke alarms shall be installed in locations where smoke alarms cannot be installed based on their *listing*.

R327.8 Fire-resistance rating. Rooms and areas containing *energy storage systems* shall be protected on the system side by fire-resistant construction in accordance with Section R302.

R327.9 Protection from impact. *Energy storage systems* installed in a location subject to vehicle damage shall be protected by *approved* barriers.

R327.10 Ventilation. Indoor installations of *energy storage systems* that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 608.13.1 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

R327.11 Toxic and highly toxic gas. *Energy storage systems* that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within one- and two-family dwellings and *townhouses*.

R327.12 Electric vehicle use. The temporary use of an owner or occupant's electric powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and NFPA 70. The batteries on electric vehicles shall not contribute to the aggregate energy limitations in Section R327.5.

Part 2 – Amendments to Appendix J of the 2015 International Residential Code

For the purposes of applying the 2015 International Residential Code in this State, Appendix J, which is currently amended and restated in its entirety in Section 2.54 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended in the manner specified in this Part 2.

2.1 Section AJ508 (Alterations – Level 1, Electrical)

Section AJ508 in Appendix J, which is currently amended and restated in Section 2.54 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended by the addition a new Section AJ 508.2, to read as follows:

AJ508.2 Energy storage system alterations. Any alteration to an existing *energy storage system* shall be made to comply with Section R327.

2.2 Section AJ604 (Alterations – Level 2, Fire and Life Safety Protection)

Section AJ604 in Appendix J, which is currently amended and restated in Section 2.54 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended by the addition a new Section AJ 604.4, to read as follows:

AJ604.4 Energy storage system installations. Rooms and areas within *dwelling units*, *sleeping units* and attached garages in which *energy storage systems* are installed shall be protected by smoke alarms in accordance with Section R314. A heat detector or heat alarm *listed* and interconnected to the smoke alarms shall be installed in locations within *dwelling units*, *sleeping units* and attached garages where smoke alarms cannot be installed based on their *listing*.

Exception: In other than bed and breakfast dwellings, heat alarms in existing areas shall not be required to be interconnected where interior wall or ceiling finishes are not removed to expose the structure.

AJ604.4.1 Power source. Heat alarms shall be permitted to be battery operated when installed in buildings without commercial power or an on-site electrical power system, or in buildings where existing interior wall or ceiling finishes are not removed to expose the structure.

AJ604.4.2 Interconnection. Heat alarms shall not be required to be interconnected where battery operated alarms are permitted.

2.3 Section AJ608 (Alterations – Level 2, Electrical)

Section AJ608 in Appendix J, which is currently amended and restated in Section 2.54 of the *2017 Uniform Code Supplement*, shall be deemed to be amended by the addition a new Section AJ 608.6 to read as follows:

AJ608.6 Energy storage system installations. *Energy storage systems* installed in existing *buildings* and *structures* shall be comply with Section R327.

Part 3 – Amendments to the 2015 International Building Code

For the purposes of applying the 2015 International Building Code (the “2015 IBC”) in this State, the 2015 IBC, certain provisions of which are currently amended by the 2017 Uniform Code Supplement, shall be deemed to be further amended in the manner specified in this Part 3.

3.1 2015 IBC Section 202 (Definitions)

Section 202 of the 2015 IBC, which is currently amended, in part, by Section 3.2 of the 2017 *Uniform Code Supplement*, shall be deemed to be further amended by the addition of definitions of the terms *energy storage system* and *gas detection system*, to read as follows:

ENERGY STORAGE SYSTEM. One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

GAS DETECTION SYSTEM. A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

3.2 2015 IBC Section 307.1.1 (Uses other than Group H)

Section 307.1.1 of the 2015 IBC shall be deemed to be amended by the addition of a new item 15, to read as follows:

15. *Energy storage systems* in accordance with the International Fire Code (as amended by the 2019 *Energy Storage System Supplement*).

3.3 2015 IBC Table 509 (Incidental Uses)

Table 509 of the 2015 IBC shall be deemed to be amended by the deletion of the last row and the addition of the following row:

ROOM OR AREA	SEPARATION AND/OR PROTECTION
<i>Energy storage systems</i> having an energy capacity greater than the threshold quantity specified in Table 608.1 of the International Fire Code (as amended by the 2019 <i>Energy Storage System Supplement</i>).	1 hour in Group B, F, M, S and U occupancies 2 hours in Group A, E, I and R occupancies.

3.4 2015 IBC Section 907.2.23 (Fire Alarm and Detection Systems, Where required—new buildings and structures, Energy storage systems)

Section 907.2.23 of the 2015 IBC (which is currently entitled “Battery rooms”) shall be deemed to be amended and restated in its entirety to read as follows:

907.2.23 Energy storage systems. An *automatic smoke detection system* shall be installed in rooms, areas, and *walk-in energy storage system units* containing *energy storage systems* as required in Section 608 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

3.5 2015 IBC Section 916 (Gas Detection Systems)

Chapter 9 of the 2015 IBC shall be deemed to be amended by the addition of a new Section 916, to read as follows:

SECTION 916 GAS DETECTION SYSTEMS

916.1 Gas detection systems. *Gas detection systems* required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. *Permits* shall be provided in accordance with Section 108 of the *2017 Uniform Code Supplement*.

916.2.1 Construction documents. Documentation of the *gas detection system* design and equipment to be used that demonstrates compliance with the requirements of this code and the International Fire Code shall be provided with the application for permit.

916.3 Equipment. *Gas detection system* equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturer's instructions.

916.4 Power connections. *Gas detection systems* shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an *approved* restraining means that secures the plug to the receptacle.

916.5 Emergency and standby power. Standby or emergency power shall be provided, or the *gas detection system* shall initiate a trouble signal at an *approved* location if the power supply is interrupted.

916.6 Sensor locations. Sensors shall be installed in *approved* locations where leaking gases are expected to accumulate.

916.7 Gas sampling. Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gases, sample analysis shall be performed at intervals not exceeding 5 minutes in accordance with Section 6004.2.2.7 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).
3. Where a less frequent or delayed sampling interval is *approved*.

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).

2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

916.9 Signage. Signs shall be provided adjacent to *gas detection system* alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 Fire alarm system connections. Gas sensors and *gas detection systems* shall not be connected to fire alarm systems unless *approved* and connected in accordance with the fire alarm equipment manufacturer's instructions.

916.11 Inspection, testing and sensor calibration. *Gas detection systems* and sensors shall be inspected, tested and calibrated in accordance with the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

3.6 2015 IBC Section 2702.2 (Emergency and Standby Power Systems, Where required)

Section 2702.2 of the 2015 IBC shall be deemed to be amended by the addition of new Sections 2702.2.17 and 2702.2.18, to read as follows:

2702.2.17 Exhaust ventilation systems. Standby power shall be provided for mechanical exhaust ventilation systems as required in accordance with the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

2702.2.18 Gas detection systems. Emergency or standby power shall be provided for *gas detection systems* in accordance with the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).

Part 4 – Amendments to the 2015 International Fire Code

For the purposes of applying the 2015 International Fire Code (the “2015 IFC”) in this State, the 2015 IFC, certain provisions of which are currently amended by the *2017 Uniform Code Supplement*, shall be deemed to be further amended in the manner specified in this Part 4.

4.1 2015 IFC Section 202 (Definitions)

Section 202 of the 2015 IFC, which is currently amended, in part, by Section 7.3 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended by the addition of definitions of the terms *energy storage management system*, *capacitor energy storage system*, *energy storage system*, *energy storage system cabinet*, *energy storage system commissioning*, *energy storage system decommissioning*, *electrochemical energy storage system*, *mobile energy storage system*, *stationary energy storage system*, *gas detection system*, and *walk-in energy storage system unit*, to read as follows:

ENERGY STORAGE MANAGEMENT SYSTEM. An electronic system that protects *energy storage systems* from operating outside their safe operating parameters and disconnects electrical power to the *energy storage system* or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

CAPACITOR ENERGY STORAGE SYSTEM. A stationary, rechargeable *energy storage system* consisting of capacitors, chargers, controls and associated electrical equipment designed to provide electrical power to a *building* or facility. The system is typically used to provide standby or emergency power, an uninterruptible power supply, load shedding, load sharing or similar capabilities.

ENERGY STORAGE SYSTEM. One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

ENERGY STORAGE SYSTEM CABINET. A cabinet containing components of the *energy storage system* that is included in the UL 9540 *listing* for the system. Personnel are not able to enter the enclosure, other than reaching in to access components for maintenance purposes.

ENERGY STORAGE SYSTEM COMMISSIONING. A systematic process that provides documented confirmation that an *energy storage system* functions according to the intended design criteria and complies with applicable code requirements.

ENERGY STORAGE SYSTEM DECOMMISSIONING. A systematic process that provides documentation and procedures that allow an *energy storage system* to be safely de-energized, disassembled, readied for shipment or storage, and removed from the premise in accordance with applicable code requirements.

ENERGY STORAGE SYSTEM, ELECTROCHEMICAL. An *energy storage system* that stores energy and produces electricity using chemical reactions. It includes, among others, battery energy storage systems and *capacitor energy storage systems*.

ENERGY STORAGE SYSTEM, MOBILE. An *energy storage system* capable of being moved and utilized for temporary energy storage applications, and not installed as fixed or stationary

electrical equipment. The system can include integral wheels for transportation or be loaded on a trailer and unloaded for charging, storage and deployment.

ENERGY STORAGE SYSTEM, STATIONARY. An *energy storage system* installed as fixed or stationary electrical equipment in a permanent location.

GAS DETECTION SYSTEM. A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

WALK-IN ENERGY STORAGE SYSTEM UNIT. A pre-fabricated building that contains *energy storage systems*. It includes doors that provide walk-in access for personnel to maintain, test and service the equipment, and is typically used in outdoor and *mobile energy storage system* applications.

4.2 2015 IFC Section 604.2 (Emergency and Standby Power Systems, Where required)

Section 604.2 of the 2015 IFC shall be deemed to be amended by the addition of new Sections 604.2.17 and 604.2.18, to read as follows:

604.2.17 Exhaust ventilation systems. Standby power shall be provided for mechanical exhaust ventilation systems as required in Section 608.13.1.2.1. The system shall be capable of powering the required load for a duration of not less than 2 hours.

604.2.18 Gas detection systems. Emergency power shall be provided for gas detection systems where required by Sections 604.2.8 and 604.2.14. Standby power shall be provided for gas detection systems where required by Section 916.5 and 608.13.1.2.4.

4.3 2015 IFC Section 608 (Energy Storage Systems)

Section 608 of the 2015 IFC (currently entitled “Stationary Storage Battery Systems”) shall be deemed to be amended and restated in its entirety to read as follows:

SECTION 608 ENERGY STORAGE SYSTEMS

608.1 Scope. *Energy storage systems* having capacities exceeding the values shown in Table 608.1 shall comply with Section 608.2 through 608.17.7.7. *Energy storage systems* in Group R-3 and R-4 occupancies, one- and two- family dwellings and townhouses shall comply with Section 608.18.

**TABLE 608.1
ENERGY STORAGE SYSTEM THRESHOLD QUANTITIES**

TECHNOLOGY	ENERGY CAPACITY ^a
Lead-acid batteries, all types	70 kWh (252 Megajoules) ^c
Nickel-cadmium batteries (Ni-Cd)	70 kWh (252 Megajoules)
Nickel metal hydride (Ni-MH)	70 kWh (252 Megajoules)
Lithium-ion batteries	20 kWh (72 Megajoules)
Flow batteries ^b	20 kWh (72 Megajoules)
Other battery technologies	10 kWh (36 Megajoules)
<i>Capacitor energy storage systems</i>	3 kWh (10.8 Mega joules)
Other <i>electrochemical energy storage systems</i> technologies	3 kWh (10.8 Mega joules)

- a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in Amp-Hours, kWh shall equal rated voltage times amp-hour rating divided by 1000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies.
- c. 50 gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.

608.2 Applicability. The provisions of this Section 608 shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of both *stationary energy storage systems* and *mobile energy storage systems*. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility.

608.2.1 Electrical wiring and equipment. Electrical wiring and equipment used in connection with *energy storage systems* shall be installed and maintained in accordance with this Chapter and NFPA 70.

608.2.2 Mixed system installation. Where *approved* by the *fire code official*, the aggregate nameplate kWh energy capacity of all *energy storage systems* in a fire area shall not exceed the maximum quantity specified for any of the *energy storage systems* in this chapter. Where required by the *Authority Having Jurisdiction*, a hazard mitigation analysis shall be provided and *approved* to evaluate any potential adverse interaction between the various *energy storage systems* and technologies.

608.3 Permits. *Building permits* and *operating permits* shall be provided in accordance with Section 108 of the *2017 Uniform Code Supplement*.

608.4 Construction documents. The following information shall be provided with the *permit* application:

1. Location and layout diagram of the room or area in which the *energy storage system* is to be installed.
2. Details on the *fire-resistance rating* of assemblies enclosing the *energy storage system*.
3. The quantities and types of *energy storage system* to be installed.
4. Manufacturer's specifications, ratings and *listings* of each *energy storage system*.
5. Description of *energy storage management systems* and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and deflagration venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with 608.9.1.
10. A decommissioning plan complying with 608.9.3.
11. Peer reviewer identification and qualifications, where required by the *Authority Having Jurisdiction*.

608.5 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other *approved* hazard mitigation analysis shall be provided under any of the following conditions:

1. Where *energy storage system* technologies not specifically identified in Table 608.1 are provided.
2. More than one *energy storage system* technology is provided in a room or enclosed area.
3. Where allowed as a basis for increasing maximum allowable quantities. See Section 608.12.2.

608.5.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

1. A thermal runaway condition in a single *energy storage system* rack, module or unit.
2. Failure of any *energy storage management system*.
3. Failure of any required ventilation or exhaust system.

4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the *energy storage system*.
6. Failure of the smoke detection, fire detection, fire suppression, or gas detection system.
7. Required spill neutralization not being provided or failure of a required secondary containment system.

608.5.2 Analysis approval. The *fire code official* may *approve* the hazardous mitigation analysis provided the consequences of the hazard mitigation analysis demonstrate:

1. Fires will be contained within unoccupied *energy storage system* rooms or areas for the minimum duration of the *fire-resistance rated* assemblies identified in Section 608.14.4.
2. Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
3. Toxic and highly toxic gases released during fires will not reach concentrations in excess of OSHA-regulated IDLH levels in the building or in adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
4. Flammable gases released from *energy storage systems* during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).
5. Flammable gases released from *energy storage systems* during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases preventing accumulation or by deflagration venting.

608.5.3 Additional protection measures. Construction, equipment and systems that are required for the *energy storage system* to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 608 shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

608.6 Large scale fire test. Where required elsewhere in Section 608, large scale fire testing shall be conducted on a representative *energy storage system* in accordance with UL 9540A or approved equivalent. The testing shall be conducted or witnessed and reported by an *approved* testing laboratory and show that a fire involving one *energy storage system* will not propagate to an adjacent *energy storage system*. In addition, the testing shall demonstrate that, where the *energy storage system* is installed within a room, enclosed area or *walk-in energy storage system unit*, a fire will be contained within the room, enclosed area or *walk-in energy storage system unit* for a duration equal to the *fire-resistance rating* of the room assemblies as specified in Section 608.14.4. The test report shall be provided to the *fire code official* for review and *approval*.

608.7 Fire remediation. Where a fire or other event has damaged the *energy storage system*, the system owner, agent, or lessee shall, at their expense, comply with Sections 608.7.1 and 608.7.2, or remove damaged equipment from the premises to a safe location.

608.7.1 Fire mitigation personnel. Where, required by the fire code official, the system owner, agent or lessee shall, at their expense, immediately dispatch one or more fire mitigation personnel

to the premises. The personnel shall remain on duty continuously after the fire department leaves the premises and until the damaged energy storage system equipment is removed from the premises, or earlier if the fire code official indicates the public safety hazard has been abated.

608.7.2 Duties. On-duty fire mitigation personnel shall have the following responsibilities:

1. Keep diligent watch for fires, obstructions to means of egress, and other hazards.
2. Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.
3. Take prompt measures for remediation of hazards in accordance with the decommissioning plan in Section 608.9.3.
4. Take prompt measures to assist in evacuation from the structures.

608.8 Peer review. Where required by the *Authority Having Jurisdiction*, the owner or the owner's authorized agent shall be responsible for retaining and furnishing the services of a *registered design professional* or special expert, who will perform as a peer reviewer, subject to the *approval* of the *fire code official*.

608.8.1 Costs. The costs of special services, where required by the *Authority Having Jurisdiction*, shall be borne by the owner or the owner's authorized agent.

608.8.2 Special expert. Where the scope of work is limited or focused in an area that does not require the services of a *registered design professional* or the special knowledge and skills associated with the practice of architecture or engineering, an *approved* special expert may be employed by the owner or the owner's authorized agent as the person in responsible charge of the limited or focused activity.

608.8.2.1 Scope of work. The scope of work of a special expert shall be limited to the area of expertise as demonstrated in the documentation submitted to the *fire code official* for review and *approval*.

608.8.2.2 Special expert qualifications. Special experts are those individuals who possess the following qualifications:

1. Has credentials of education and experience in an area of practice that is needed to evaluate risks and safe operations associated with the design, operation and special hazards of *energy storage systems*.
2. Licensing or registration, when required by any other applicable statute, regulation, or local law or ordinance.

608.9 Commissioning, decommissioning, operation and maintenance. *Energy storage system commissioning, energy storage system decommissioning, operation, and maintenance* shall be conducted in accordance with this section.

608.9.1 Commissioning. *Energy storage system commissioning* of newly installed *energy storage systems*, and existing *energy storage systems* that have been retrofitted, replaced or previously decommissioned and are returning to service, shall be conducted prior to the *energy storage system* being placed in service, in accordance with a commissioning plan that has been *approved* prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning including the personnel intended to accomplish each of the activities.
2. A listing of the specific *energy storage system* and associated components, controls and safety related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the *energy storage system*.
5. Verification that required equipment and systems are installed in accordance with the *approved plans and specifications*.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the *energy storage system* installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the *energy storage system*, and respond to incidents involving the *energy storage system*, including documentation that such service has been contracted for.
12. A decommissioning plan in accordance with Section 608.9.3.

Exception: *Energy storage system commissioning* shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. However, a decommissioning plan shall be provided and maintained where required by the *Authority Having Jurisdiction*.

608.9.1.1 Initial acceptance testing. During the commissioning process an *energy storage system* shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final *approval*.

608.9.1.2 Commissioning report. A report describing the results of the *energy storage system commissioning* and including the results of the initial acceptance testing required in Section 608.9.1.1 shall be provided to the *fire code official* prior to final inspection and *approval* and maintained at an *approved* on-site location.

608.9.2 Operation and Maintenance Manual. An Operation and Maintenance Manual (O&M) shall be provided to both the *energy storage system* owner or their authorized agent and to the *energy storage system* operator before the *energy storage system* is put into operation. The *energy storage system* shall be operated and maintained in accordance with

the manual and a copy of the manual shall be retained at an approved onsite location. The O&M shall include the following:

1. Manufacturer's O&M for the entire *energy storage system* or for each component of the system requiring maintenance, that clearly identifies the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the *energy storage system* and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage systems controls.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. A schedule for inspecting and recalibrating all *energy storage system* controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on site.
7. Inspection and testing records shall be maintained in the O&M.

608.9.2.1 Systems monitoring. Systems that monitor and protect the *energy storage system* installation shall also be inspected and tested in accordance with the manufacturer's instructions and Section 608.9.2.

608.9.3 Decommissioning. The *Authority Having Jurisdiction* shall be notified prior to *energy storage system decommissioning*. Decommissioning or removal of the *energy storage system* from service, and from the facility in which it is located, shall be performed in accordance with the decommissioning plan. The plan shall include details on providing a safe and orderly shutdown of the *energy storage system* that includes the following:

1. A narrative description of the activities to be accomplished for removing the *energy storage system* from service, and from the facility in which it is located.
2. A listing of any contingencies for removing an intact operational *energy storage system* from service, and for removing an *energy storage system* from service that has been damaged by a fire or other event.

608.10 Equipment. *Energy storage systems* and equipment shall comply with Sections 608.10.1 through 608.10.9

608.10.1 Energy storage system listings. *Energy storage systems* shall be *listed* in accordance with UL 9540.

Exception: Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76 are not required to be *listed*.

608.10.2 Equipment listing. Chargers, inverters, *energy storage management systems* shall be covered as part of the UL 9540 *listing* or shall be *listed* separately.

608.10.3 Utility interactive systems. Only inverters *listed* and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads. Inverters shall be listed and labeled in accordance with UL 1741.

608.10.4 Energy storage management system. Where required by the *energy storage system listing* an *approved energy storage management system* shall be provided that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications. The system shall disconnect electrical connections to the *energy storage system* or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

608.10.5 Enclosures. Enclosures of *energy storage systems* shall be of noncombustible construction.

608.10.6 Repairs. Repairs of *energy storage systems* shall only be done by qualified personnel. Repairs with other than identical parts shall be considered a retrofit and comply with Section 608.10.7. Repairs shall be documented in the service records log.

608.10.7 Retrofits. Retrofitting of an existing *energy storage system* shall comply with the following:

1. A *building permit* shall be obtained in accordance with Section 108 of the *2017 Uniform Code Supplement*.
2. New batteries, battery modules, capacitors and similar *energy storage system* components shall be *listed*.
3. *Energy storage management systems* and other monitoring systems shall be connected and installed in accordance with the manufacturer's instructions.
4. The overall installation shall continue to comply with UL 9540 *listing* requirements, where applicable.
5. Systems that have been retrofitted shall be commissioned in accordance with Section 608.9.1.
6. Retrofits shall be documented in the service records log.

Exception: Retrofitting of lead-acid and nickel-cadmium batteries with other lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.

608.10.8 Replacements. Replacements of *energy storage systems* shall be considered new *energy storage system* installations and shall comply with the provisions of Section 608 as applicable to new *energy storage systems*. The *energy storage system* being replaced shall be decommissioned in accordance with Section 608.9.3.

608.10.9 Reused and repurposed equipment. Equipment and materials shall only be reused or reinstalled as *approved* by the *fire code official*. Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be reused in applications regulated by this Chapter, unless (1) *approved* by the *fire code official* and (2) the equipment is refurbished by a battery refurbishing company *approved* in accordance with UL 1974.

608.11 General installations requirements. *Energy storage systems* shall comply with the requirements of Sections 608.11.1 through 608.11.12.

608.11.1 Electrical disconnects. Where the *energy storage system* disconnecting means is not within sight of the main electrical service disconnecting means, placards or directories shall be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means, in accordance with NFPA 70.

Exception: Electrical disconnects for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC shall be permitted to have electrical disconnects signage in accordance with NFPA 76.

608.11.2 Working clearances. Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment, in accordance with NFPA 70 and the manufacturer's instructions.

608.11.3 Fire-resistance rated construction. Rooms and other indoor areas containing *energy storage systems* shall be separated from other areas of the building in accordance with Section 608.14.4 and Chapter 7 of this code. *Energy storage systems* shall be permitted to be in the same room as the equipment they support.

608.11.4 Seismic and structural design. Stationary *energy storage systems* shall comply with the seismic design requirements in Chapter 16 of the International Building Code and shall not exceed the floor loading limitation of the building.

608.11.5 Vehicle impact protection. Where *energy storage systems* are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312 of this code.

608.11.6 Combustible storage. Combustible materials shall not be stored in *energy storage system* rooms, areas, or *walk-in energy storage system units*. Combustible materials in occupied work centers covered by Section 608.11.10 shall be stored at least 3 feet (914 mm) from *energy storage system cabinets*.

608.11.7 Toxic and highly toxic gases. *Energy storage systems* that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall be provided with a hazardous exhaust system in accordance with Section 502.8 of the International Mechanical Code.

608.11.8 Signage. *Approved* signs shall be provided on or adjacent to all entry doors to *energy storage system* rooms or areas, to *walk-in energy storage system units* located outdoors, on rooftops, or in open parking garages, and on enclosures of *energy storage system cabinets*. Signs shall be designed to meet both the requirements of this section and of NFPA 70. The signage shall include the following or equivalent.

1. "Energy Storage System", "Battery Storage System", "Capacitor Energy Storage System", or the equivalent.
2. The identification of the *electrochemical energy storage system* technology present.
3. "Energized electrical circuits"

4. If water reactive *electrochemical energy storage systems* are present the signage shall include "APPLY NO WATER"
5. Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 608.7.1.

608.11.9 Security of installations. Rooms, areas and *walk-in energy storage system units* in which *electrochemical energy storage systems* are located shall be secured against unauthorized entry and safeguarded in an *approved* manner. Security barriers, fences, landscaping, and other enclosures shall not inhibit the required air flow to or exhaust from the *electrochemical energy storage system* and its components.

608.11.10 Occupied work centers. *Electrochemical energy storage systems* located in rooms or areas occupied by personnel not directly involved with maintenance, service and testing of the systems shall comply with the following:

1. *Electrochemical energy storage systems* located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.
2. Where *electrochemical energy storage systems* are contained in cabinets in occupied work centers, the cabinets shall be located within 10 feet (3048 mm) of the equipment that they support.
3. Cabinets shall include signage complying with Section 608.11.8.

608.11.11 Open rack installations. Where *electrochemical energy storage systems* are installed in a separate equipment room and only authorized personnel have access to the room, they shall be permitted to be installed on an open rack.

608.11.12 Walk-in units. *Walk-in energy storage system units* shall only be entered for inspection, maintenance and repair of *energy storage system units* and ancillary equipment and shall not be occupied for other purposes.

608.12 Electrochemical Energy Storage System Protection. Where required by Section 608.14 through 608.17, the protection of *electrochemical energy storage systems* shall be in accordance with Sections 608.12.1 through 608.12.8.

608.12.1 Size and separation. *Electrochemical energy storage systems* shall be segregated into groups not exceeding 50 kWh (180 Mega joules). Each group shall be separated a minimum 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10 of this code.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. The *fire code official* may *approve* larger capacities or smaller separation distances based on large scale fire testing complying with Section 608.6.

608.12.2 Maximum allowable quantities. Fire areas within rooms, areas and *walk-in energy storage system units* containing *electrochemical energy storage systems* shall not exceed the maximum allowable quantities in Table 608.12.

Exceptions:

1. Where *approved* by the *fire code official*, rooms, areas and *walk-in energy storage system units* containing *electrochemical energy storage systems* that exceed the amounts in Table 608.12 shall be permitted based on a hazard mitigation analysis in accordance with Section 608.5 and large-scale fire testing complying with Section 608.6.
2. Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
3. Dedicated use buildings in compliance with Section 608.14.1.

608.12.2.1 Mixed electrochemical energy systems. Where rooms, areas and *walk-in energy storage system units* contain different types of electrochemical energy technologies, the total aggregate quantities of the systems shall be determined based on the sum of percentages of each technology type quantity divided by the maximum allowable quantity of each technology type. The sum of the percentages shall not exceed 100 percent of the maximum allowable quantity.

608.12.3 Elevation. *Electrochemical energy storage systems* shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or
2. Where the floor is located below the lowest level of *exit discharge*.

Exceptions:

1. Lead-acid and Nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Where *approved* by the *fire code official*, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
3. Where approved by the fire code official, installations shall be permitted on higher and lower floors, based on large scale fire testing complying with Section 608.6 or on hazard mitigation analysis complying with Section 608.5.

**TABLE 608.12
MAXIMUM ALLOWABLE QUANTITIES OF
ELECTROCHEMICAL ENERGY STORAGE SYSTEMS**

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES ^a
STORAGE BATTERIES	
Lead-acid, all types	Unlimited
Nickel-cadmium (Ni-Cd)	Unlimited
Nickel metal hydride (Ni-MH)	Unlimited
Lithium-ion	600 kWh
Flow batteries ^b	600 kWh
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ENERGY STORAGE SYSTEM	
All types	20 kWh

- a. For *electrochemical energy storage system* units rated in Amp-Hours, kWh shall equal rated voltage times the Amp-hour rating divided by 1000
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte type technologies

608.12.4 Fire detection. An *approved* automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907 shall be installed in rooms, indoor areas, and *walk-in energy storage system units* containing *electrochemical energy storage systems*. An *approved* radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be monitored by an *approved* supervising station in accordance with NFPA 72.

608.12.4.1 System status. Where required by the *Authority Having Jurisdiction*, visible annunciation shall be provided on cabinet exteriors or in other *approved* locations to indicate that potentially hazardous conditions associated with the *energy storage system* exist.

608.12.5 Fire suppression systems. Rooms and areas within buildings and *walk-in energy storage system units* containing *electrochemical energy storage systems* shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. An *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a minimum density of 0.3 gpm/ft² based on the fire area or on a 2,500 ft² design area, whichever is smaller.
2. Where *approved*, based on large scale fire testing complying with Section 608.6, an *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification.
3. Where *approved*, based on large scale fire testing complying with Section 608.6, the following alternate *automatic fire extinguishing systems* designed and installed in accordance with Section 904:
 - 3.1 NFPA 12, Standard on Carbon Dioxide Extinguishing Systems
 - 3.2 NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection
 - 3.3 NFPA 750, Standard on Water Mist Fire Protection Systems
 - 3.4 NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems
 - 3.5 NFPA 2010, Standard for Fixed Aerosol Fire Extinguishing Systems

Exception: Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.

608.12.5.1 Water reactive systems. Where an *electrochemical energy storage system* that utilizes water reactive materials is *approved* based on large-scale fire testing complying with Section 608.6, it shall be protected by an *approved alternative automatic fire extinguishing system* in accordance with Section 904.

608.12.6 Maximum enclosure size. Outdoor *walk-in energy storage system units* housing *energy storage systems* shall not exceed 53 feet by 8 feet by 9.5 feet high, not including bolt-on HVAC and related equipment, as *approved*. Outdoor *walk-in energy storage system units* exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 608.14.

608.12.7 Vegetation control. Areas within 10 feet (3 m) on each side of outdoor *energy storage system* shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted, provided that they do not form a means of readily transmitting fire.

608.12.8 Means of egress separation. *Energy storage systems* located outdoors and in open parking garages shall be separated from any *means of egress* to ensure safe egress under fire conditions by no less than 10 feet (3048 mm).

Exception: The *fire code official* may approve a reduced separation distance if large scale fire testing complying with Section 608.6 is provided that shows that a fire involving the *energy storage system* will not adversely impact occupant egress.

608.13 Electrochemical energy storage system technology specific protection.

Electrochemical energy storage system installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 608.13.

**TABLE 608.13
ELECTROCHEMICAL ENERGY STORAGE SYSTEM
TECHNOLOGY SPECIFIC REQUIREMENTS**

COMPLIANCE REQUIRED ^b	BATTERY TECHNOLOGY				OTHER ENERGY STORAGE SYSTEM AND BATTERY TECHNOLOGIES ^b	CAPACITOR ENERGY STORAGE SYSTEM ^b
	Lead- acid	Ni- Cad and Ni-MH	Lithium- ion	Flow		
608.13.1 Exhaust ventilation	Yes	Yes	No	Yes	Yes	Yes
608.13.2 Spill control and neutralization	Yes ^c	Yes ^c	No	Yes	Yes	Yes
608.13.3 Explosion control	Yes ^a	Yes ^a	Yes	No	Yes	Yes
608.13.4 Safety caps	Yes	Yes	No	No	Yes	Yes
608.13.5 Thermal runaway	Yes ^d	Yes	Yes ^e	No	Yes ^e	Yes

- a. Not required for lead-acid and nickel cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
- b. Protection shall be provided unless documentation acceptable to the *fire code official* is provided that provides justification why the protection is not necessary based on the technology used.
- c. Applicable to vented (i.e. flooded) type nickel-cadmium and lead-acid batteries.
- d. Not required for vented (i.e. flooded) type lead-acid batteries.
- e. The thermal runaway protection is permitted to be part of an *energy storage management system* that has been evaluated with the battery as part of the evaluation to UL 1973.

608.13.1 Exhaust ventilation. Where required by Table 608.13 or elsewhere in this code, exhaust ventilation shall be provided for rooms, areas, and *walk-in energy storage system units* containing *electrochemical energy storage systems* in accordance with the International Mechanical Code and Section 608.13.1.1 or 608.13.1.2

608.13.1.1 Ventilation based upon LFL. The exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area, or *walk-in energy storage system unit* during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

608.13.1.2 Ventilation based upon exhaust rate. Mechanical exhaust ventilation shall be provided at a rate of not less than 1 ft³/min/ft²(5.1 L/sec/m²) of floor area of the room, area, or *walk-in energy storage system unit*. The ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 608.13.1.2.4.

608.13.1.2.1 Standby power. Mechanical exhaust ventilation shall be provided with a minimum of two hours of standby power in accordance with Section 604.2.17.

608.13.1.2.2 Installation instructions. Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer's installation instructions and the International Mechanical Code.

608.13.1.2.3 Supervision. Required mechanical exhaust ventilation systems shall be supervised by an *approved* supervising station in accordance with NFPA 72.

608.13.1.2.4 Gas detection system. Where required by Section 608.13.1.2, rooms, areas, and *walk-in energy storage system units* containing *energy storage systems* shall be protected by an *approved* continuous gas detection system that complies with Section 916 of this code and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area, or *walk-in energy storage system unit* exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with requirements for emergency and standby power systems for gas detection systems in Section 916 of this code.
4. Failure of the gas detection system shall annunciate a trouble signal at an *approved* supervising station in accordance with NFPA 72.

608.13.2 Spill control and neutralization. Where required by Table 608.13 or elsewhere in this code, areas containing free-flowing liquid electrolyte or hazardous materials shall be provided with spill control and neutralization in accordance with this section.

608.13.2.1 Spill control. Spill control shall be provided to prevent the flow of liquid electrolyte or hazardous materials to adjoining rooms or areas. The method shall be capable of containing a spill from the single largest battery or vessel.

608.13.2.2 Neutralization. An *approved* method to neutralize spilled liquid electrolyte shall be provided that is capable of neutralizing a spill from the largest battery or vessel to a pH between 5.0 and 9.0.

608.13.2.3 Communication Utilities. The requirements of Section 608.13.2 only apply where the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L) for lead-acid and nickel-cadmium battery systems operating at less than 50 VAC and 60 VDC that are located at facilities under the exclusive control of communications utilities and those facilities comply with NFPA 76 in addition to applicable requirements of this code.

608.13.3 Explosion control. Where required by Table 608.13 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas or *walk-in energy storage system units* containing *electrochemical energy storage system* technologies.

Exceptions:

1. Where *approved* by the *fire code official*, explosion control may be waived based on large scale fire testing complying with Section 608.6 which demonstrates that flammable gases are not liberated from *electrochemical energy storage system* cells or modules.
2. Where *approved* by the *fire code official*, explosion control may be waived based on documentation provided that demonstrates that the *electrochemical energy storage system* technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, *walk-in energy storage system unit* or structure under thermal runaway or other fault conditions.

608.13.4 Safety caps. Where required by Table 608.13 or elsewhere in this code, vented batteries and other *energy storage systems* shall be provided with flame arresting safety caps.

608.13.5 Thermal runaway. Where required by Table 608.13 or elsewhere in this code, batteries and other *energy storage systems* shall be provided with a *listed* device or other *approved* method to prevent, detect and minimize the impact of thermal runaway.

608.14 Indoor installations. Indoor *energy storage system* installations shall be in accordance with Sections 608.14.1 through 608.14.4.

608.14.1 Dedicated use buildings. Dedicated use buildings in compliance with this section shall be classified as Group F-1 occupancies. For the purpose of Table 608.14, dedicated use *energy storage system* buildings shall comply with all the following:

1. The building shall only be used for *energy storage systems*, electrical energy generation, and other electrical grid related operations.
2. Other occupancy types shall not be permitted in the building.
3. Occupants in the rooms and areas containing *energy storage systems* are limited to personnel that operate, maintain, service, test and repair the *energy storage system* and other energy systems.
4. Administrative and support personnel shall be permitted in areas within the buildings that do not contain *energy storage systems* provided:
 - 4.1 The areas do not occupy more than 10 percent of the building area of the story in which they are located.
 - 4.2 A *means of egress* is provided from the administrative and support use areas to the public way that does not require occupants to traverse through areas containing *energy storage systems* or other energy system equipment

**TABLE 608.14
INDOOR ENERGY STORAGE SYSTEM INSTALLATIONS**

COMPLIANCE REQUIRED	DEDICATED USE BUILDINGS ^a	NON-DEDICATED USE BUILDINGS ^b
608.11 General installation requirements	Yes	Yes
608.12.1 Size and separation	Yes	Yes
608.12.2 Maximum allowable quantities	No	Yes
608.12.3 Elevation	Yes	Yes
608.12.4 Smoke and automatic fire detection ^e	Yes ^c	Yes
608.12.5 Fire suppression systems	Yes ^d	Yes
608.14.3 Dwelling units and sleeping units	NA	Yes
608.14.4 Fire-resistance rating	Yes	Yes
608.13 Technology specific protection	Yes	Yes

NA = Not allowed.

a. See Section 608.14.1.

b. See Section 608.14.2.

c. Where *approved* by the *fire code official*, alarm signals are not required to be monitored by an *approved* supervising station in accordance with NFPA 72.

d. Where *approved* by the *fire code official*, fire suppression systems are permitted to be omitted in dedicated use buildings located more than 100 feet (30.5 M) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high piled stock and other exposure hazards.

e. Lead-acid and nickel-cadmium battery systems installed in Group U buildings and structures less than 1500 ft² (140 m²) under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76 are not required to have an *approved* automatic smoke or fire detection system.

608.14.2 Non-dedicated use buildings. For the purpose of Table 608.14, non-dedicated use buildings include all buildings that contain *energy storage systems* and do not comply with the Section 608.14.1 dedicated use building requirements.

608.14.3 Dwelling units and sleeping units. *Energy storage systems* shall not be installed in *sleeping units* or in *habitable spaces* of *dwelling units*.

608.14.4 Fire-resistance rating. Separation shall be provided by 2 hour rated *fire barriers* constructed in accordance with Section 707 of the International Building Code and 2 hour rated *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, as appropriate. Rooms and areas containing *energy storage systems* shall be protected on the system side as follows:

1. In dedicated use buildings, *fire-resistance rated* assemblies shall be provided between rooms and areas containing *energy storage systems* and areas in which administrative and support personnel are located.
2. In non-dedicated use buildings, *fire-resistance rated* assemblies shall be provided between rooms and areas containing *energy storage systems* and other areas in the *building*.

608.15 Outdoor installations. Outdoor installations shall be in accordance with Sections 608.15.1 through 608.15.3. Exterior wall installations for individual *energy storage system* units not exceeding 20 kWh shall be in accordance with Sections 608.15.3 and 608.15.4.

608.15.1 Remote outdoor installations. For the purpose of Table 608.15, remote outdoor installations include *energy storage systems* located more than 100 feet (30.5 M) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high piled stock and other exposure hazards.

608.15.2 Installations near exposures. For the purpose of Table 608.15, installations near exposures include all outdoor *energy storage system* installations that do not comply with Section 608.15.1 remote outdoor location requirements.

**TABLE 608.15
OUTDOOR ENERGY STORAGE SYSTEM INSTALLATIONS ^a**

COMPLIANCE REQUIRED	REMOTE INSTALLATIONS ^a	INSTALLATIONS NEAR EXPOSURES ^b
608.11 General installation requirements	Yes	Yes
608.12.1 Size and separation	No	Yes ^c
608.12.2 Maximum allowable quantities	No	Yes
608.12.4 Smoke and automatic fire detection	Yes	Yes
608.12.5 Fire suppression systems	Yes ^d	Yes
608.12.6 Maximum enclosure size	Yes	Yes
608.12.7 Vegetation control	Yes	Yes
608.12.8 Means of egress separation	Yes	Yes
608.15.3 Clearance to exposures	Yes	Yes
608.13 Technology specific protection	Yes	Yes

a. See Section 608.15.1.

b. See Section 608.15.2.

c. In outdoor *walk-in energy storage system units*, spacing is not required between *energy storage system units* and the walls of the enclosure.

d. Where *approved* by the *fire code official*, fire suppression systems are permitted to be omitted.

608.15.3 Clearance to exposures. *Energy storage systems* located outdoors shall be separated by a minimum 10 feet (3048 mm) from the following exposures:

1. *Lot lines*

2. *Public ways*
3. *Buildings*
4. Stored combustible materials
5. *Hazardous materials*
6. High-piled storage
7. Other exposure hazards

Exceptions:

1. Clearances from exposures are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1.5 m) above and 5 feet (1.5 m) horizontally beyond the physical boundary of the *energy storage system* installation is provided to protect the exposure.
2. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where noncombustible exterior walls without openings or combustible overhangs are provided on the wall adjacent to the *energy storage system* and the *fire-resistance rating* of the exterior wall is no less than 2 hours.
3. Clearances to buildings are permitted to be reduced to 3 feet (914.4 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the *energy storage system*, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large scale fire testing complying with Section 608.6.
4. Where exterior wall installations in accordance with Section 608.15.4 are provided, the clearance between the energy storage system and the wall in which it is mounted, is permitted to be reduced to zero.

608.15.4 Exterior wall installations. *Energy storage systems* shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

1. The maximum energy capacity of individual *energy storage system* units shall not exceed 20 kWh.
2. The *energy storage system* shall comply with applicable requirements in Section 608.15.
3. The *energy storage system* shall be installed in accordance with the manufacturer's instructions and their *listing*.
4. Individual *energy storage system* units shall be separated from each other by at least 3 feet (914 mm).
5. The *energy storage system* shall be separated from doors, windows, operable openings into buildings, or HVAC inlets by at least 5 feet (1524 mm)

Exception: Where *approved* by the *fire code official*, smaller separation distances in items 4 and 5 shall be permitted based on large scale fire testing complying with Section 608.6.

608.16 Special installations. Rooftop and open parking garage *energy storage system* installations shall comply with Sections 608.16.1 through 608.16.6.

**TABLE 608.16
SPECIAL ENERGY STORAGE SYSTEM INSTALLATIONS**

COMPLIANCE REQUIRED	ROOFTOPS ^a	OPEN PARKING GARAGES ^b
608.11 General installation requirements	Yes	Yes
608.12.1 Size and separation	Yes	Yes
608.12.2 Maximum allowable quantities	Yes	Yes
608.12.4 Smoke and automatic fire detection	Yes	Yes
608.12.6 Maximum enclosure size	Yes	Yes
608.12.8 Means of egress separation	Yes	Yes
608.16.3 Clearance to exposures	Yes	Yes
608.16.4 Fire suppression systems	Yes	Yes
608.16.5 Rooftop installations	Yes	No
608.16.6 Open parking garage installations	No	Yes
608.13 Technology specific protection	Yes	Yes

a. See Section 608.16.1.

b. See Section 608.16.2.

608.16.1 Rooftop installations. For the purpose of Table 608.16, rooftop *energy storage system* installations are those located on the roofs of buildings.

608.16.2 Open parking garage installations. For the purpose of Table 608.16, open parking garage *energy storage system* installations are those located in a structure or portion of a structure that complies with Section 406.5 of the International Building Code.

608.16.3 Clearance to exposures. *Energy storage systems* located on rooftops and in open parking garages shall be separated by a minimum 10 feet (3048 mm) from the following exposures:

1. *Buildings*, except the *building* on which a rooftop *energy storage system* is mounted
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed
3. *Lot lines*
4. *Public ways*
5. Stored combustible materials
6. Locations where motor vehicles can be parked
7. *Hazardous materials*
8. Other exposure hazards

Exceptions:

1. Clearances from exposures are permitted to be reduced to 3 feet (914 mm) where a 1-hour free standing fire barrier, suitable for exterior use, and extending 5 feet (1.5 m) above and extending 5 feet (1.5 m) beyond the physical boundary of the *energy storage system* installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914.4 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the *energy storage system* and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large scale fire testing complying with Section 608.6.

608.16.4 Fire suppression systems. *Energy storage systems* located in *walk-in energy storage system units* on rooftops or in *walk-in energy storage system units* in open parking garages shall be provided with *automatic fire suppression systems* within the *energy storage system* enclosure in accordance with Section 608.12.5. Areas containing *energy storage systems* other than *walk-in energy storage system units* in open parking structures on levels not open above to the sky shall be provided with an *automatic fire suppression system* complying with Section 608.12.5.

Exception: A fire suppression system is not required in open parking garages if large scale fire testing complying with Section 608.6 is provided that shows that a fire will not impact the exposures in Section 608.16.3.

608.16.5 Rooftop. *Energy storage systems* and associated equipment that are located on rooftops and not enclosed by *building* construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.

3. *Energy storage systems* and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 feet (1.5 m).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from an *energy storage system* or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an *approved* location on the roof level of the *building* or in the stairway bulkhead at the top level.
6. The *energy storage system* shall be the minimum of 10 feet from the fire service access point on the roof top.
7. *Energy storage systems* shall not be located within 50 feet (15,240 mm) of air inlets for building HVAC systems.

Exception: This distance shall be permitted to be reduced to 25 feet (7.620 mm) if the *automatic fire alarm system* monitoring the radiant-energy sensing detectors deenergizes the ventilation system connected to the air intakes upon detection of fire.

608.16.6 Open parking garages. *Energy storage systems* and associated equipment that are located in open parking garages shall comply with all of the following:

1. *Energy storage systems* shall not be located within 50 feet (15,240 mm) of air inlets for building HVAC systems.

Exception: This distance shall be permitted to be reduced to 25 feet (7.620 mm) if the *automatic fire alarm system* monitoring the radiant-energy sensing detectors deenergizes the ventilation system connected to the air intakes upon detection of fire.

2. *Energy storage systems* shall not be located within 25 feet (7620 mm) of exits where located on a covered level of the parking structure not directly open to the sky above.
3. An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1024 mm) from the outer enclosure of the *energy storage system*.

608.17 Mobile energy storage system equipment and operations. *Mobile energy storage system* equipment and operations shall comply with Sections 608.17.1 through 608.17.7.7

608.17.1 Charging and storage. For the purpose of Section 608.17, charging and storage covers the operation where *mobile energy storage systems* are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.

608.17.2 Deployment. For the purpose of Section 608.17, deployment covers operations where *mobile energy storage systems* are located at a site other than the charging and storage site and are being used to provide power.

608.17.3 Permits. *Building permits* and *operating permits* shall be provided as required by Section 108 of the *2017 Uniform Code Supplement*.

608.17.4 Construction documents. Construction documents complying with Section 608.4 shall be provided with the *building permit* application for *mobile energy storage system* charging and storage locations.

608.17.4.1 Deployment documents. The following information shall be provided with the *operating permit* applications for *mobile energy storage system* deployments:

1. Relevant information for the *mobile energy storage system* equipment and protection measures in the construction documents required by Section 608.4.
2. Location(s) and layout diagram(s) of the area(s) in which the *mobile energy storage system* is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking signs and signage complying with Section 608.11.8.
4. Description of fencing to be provided around the *energy storage system*, including locking methods.
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation, and explosion control, if provided.
6. The intended duration of the deployment operation, including anticipated connection and disconnection times and dates.
7. Location and description of local staging stops during transit to the deployment site. See Section 608.17.7.5.
8. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.
9. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.
10. Contact information for personnel who are responsible for maintaining and servicing the equipment and responding to emergencies as required by Section 608.7.1.

608.17.5 Approved locations. Locations where *mobile energy storage systems* are charged, stored and deployed shall be restricted to the locations established on the *building permits* and *operating permits*.

608.17.5.1 Local staging. *Mobile energy storage systems* in transit from the charging and storage location to the deployment location and back shall not be parked within 100 feet (30,480 mm) of an occupied building for more than one hour during transit, unless specifically permitted by Section 608.17.3.

608.17.6 Charging and storage. Installations where *mobile energy storage systems* are charged and stored shall be treated as permanent indoor or outdoor *energy storage system* installations, and shall comply with the following sections, as applicable:

1. Indoor charging and storage shall comply with Section 608.14.

2. Outdoor charging and storage shall comply with Section 608.15.
3. Charging and storage on rooftops and in open parking garages shall comply with Section 608.16.

Exceptions:

1. Electrical connections shall be permitted to be made using temporary wiring complying with the manufacturer's instructions, the UL 9540 *listing*, and NFPA 70.
2. Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections.

608.17.7 Deployed mobile energy storage system requirements. Deployed *mobile energy storage system* equipment and operations shall comply with this section and Table 608.17.

608.17.7.1 Duration. The duration of a *mobile energy storage system* deployment shall not exceed 30 days.

Exceptions:

1. *Mobile energy storage system* deployments that provide power for durations longer than 30 days shall comply with Section 608.17.6.
2. *Mobile energy storage system* deployments shall not exceed 180 days unless additional *operating permits* are obtained.

608.17.7.2 Restricted locations. Deployed *mobile energy storage system* operations shall not be located indoors, in covered parking garages, on rooftops, below grade, or under building overhangs.

608.17.7.3 Clearance to exposures. Deployed *mobile energy storage systems* shall be separated by a minimum 50 feet (15.3 M) from public seating areas and from tents, canopies and membrane structures with an occupant load of 30 or more. Deployed *mobile energy storage systems* shall be separated by a minimum 10 feet (3048 mm) from the following exposures:

1. Public ways
2. Buildings
3. Stored combustible materials
4. Hazardous materials
5. High-piled stock
6. Other exposure hazards

608.17.7.4 Electrical connections. Electrical connections shall be made in accordance with the manufacturer's instructions and the UL 9540 *listing*. Temporary wiring for electrical power connections shall comply with NFPA 70. Fixed electrical wiring shall not be provided.

608.17.7.5 Fencing. An *approved* fence with a locked gate or other *approved* barrier shall be provided to keep the general public at least 5 feet (1024 mm) from the outer enclosure of a deployed *mobile energy storage system*.

608.17.7.6 Smoking. Smoking shall be prohibited within 10 feet (3048 mm) of *mobile energy storage systems*. Signs shall be posted in accordance with Section 310.

**TABLE 608.17
MOBILE ENERGY STORAGE SYSTEMS**

COMPLIANCE REQUIRED	DEPLOYMENT ^a
608.11 General installation requirements	Yes ^b
608.12.1 Size and separation	Yes ^c
608.12.2 Maximum allowable quantities	Yes
608.12.4 Smoke and automatic fire detection	Yes ^e
608.12.5 Fire suppression systems	Yes ^d
608.12.6 Maximum enclosure size	Yes
608.12.7 Vegetation control	Yes
608.12.8 Means of egress separation	Yes
608.13 Technology specific protection	Yes

- a. See Section 608.17.2.
- b. Mobile operations on wheeled vehicle or trailers shall not be required to comply with the seismic and structural load requirements of Section 608.11.4.
- c. In *walk-in energy storage system units*, spacing is not required between *energy storage system* units and the walls of the enclosure.
- d. Fire suppression system connections to the water supply shall be permitted to use *approved* temporary connections.
- e. Alarm signals are not required to be transmitted to an *approved* location for *mobile energy storage systems* deployed 30 days or less.

608.18 Energy storage systems in Group R-3, and R-4 Occupancies. *Energy storage systems* in Group R-3 and R-4 occupancies shall be installed and maintained in accordance with Sections 608.18.1 through 608.18.9. The temporary use of an owner or occupant's electric powered vehicle as an *energy storage system* shall be in accordance with Section 608.18.11.

Energy storage system installations exceeding the permitted aggregate ratings in Section 608.18.4 shall be installed in accordance with Section 608.2 through 608.17.7.7.

608.18.1 Equipment listings. *Energy storage systems* shall be *listed* and *labeled* for residential use in accordance with UL 9540. *Energy storage systems listed* and *labeled* solely for utility or commercial use shall not be used for residential applications.

Exceptions:

1. Where *approved* by the *fire code official*, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.
2. *Energy storage systems* less than 1 kWh (3.6 megajoules).

608.18.2 Installation. *Energy storage systems* shall be installed in accordance with the manufacturer's instructions and their *listing*.

608.18.2.1 Spacing. Individual units shall be separated from each other by at least 3 feet of spacing unless smaller separation distances are documented to be adequate based on large scale fire testing complying with Section 608.6.

608.18.3 Location. *Energy storage systems* shall only be installed in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the *dwelling unit* living space and *sleeping units* in accordance with Section 406.3.4 of the International Building Code.
3. Outdoors on exterior walls located a minimum 3 ft. from doors and windows.
4. Utility closets and storage or utility spaces within *dwelling units* and *sleeping units*

608.18.4 Energy ratings. Individual *energy storage system* units shall have a maximum rating of 20 kWh. The aggregate rating shall not exceed:

1. 40 kWh within utility closets and storage or utility spaces
2. 80 kWh in attached or detached garages and detached *accessory structures*
3. 80 kWh on exterior walls
4. 80 kWh outdoors on the ground

608.18.5 Electrical installation. *Energy storage systems* shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 *listing*. Systems connected to the utility grid shall use inverters *listed* for utility interaction.

608.18.6 Fire detection. Rooms and areas within *dwelling units*, *sleeping units* and attached garages in which *energy storage systems* are installed shall be protected by smoke alarms in accordance with Section 907. A heat detector or heat alarm *listed* and interconnected to the smoke alarms shall be installed in locations within *dwelling units*, *sleeping units* and attached garages where smoke alarms cannot be installed based on their *listing*.

608.18.7 Fire-resistance rating. Rooms and areas containing *energy storage systems* shall be protected on the system side by 2-hour rated *fire barriers* constructed in accordance with

Section 707 of the International Building Code and 2 hour rated *horizontal assemblies* constructed in accordance with Section 711 of the International Building Code, as applicable.

608.18.8 Protection from impact. *Energy storage systems* installed in a location subject to vehicle damage shall be protected by *approved barriers*.

608.18.9 Ventilation. Indoor installations of *energy storage systems* that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 608.13.1.

608.18.10 Toxic and highly toxic gas. *Energy storage systems* that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 and R-4 occupancies.

608.18.11 Electric vehicle use. The temporary use of an owner or occupant's electric powered vehicle to power a *dwelling unit* or *sleeping unit* while parked in an attached or detached garage or outside, shall comply with the vehicle manufacturer's instructions and NFPA 70. The batteries on electric vehicles shall not contribute to the aggregate energy limitations in Section 608.18.4.

4.4 2015 IFC Section 907.2.23 (Fire Alarm and Detection Systems, Where required – new buildings and structures)

Section 907.2.23 of the 2015 IFC (currently entitled “Battery rooms”) shall be deemed to be amended and restated in its entirety to read as follows:

907.2.23 Energy storage systems. An automatic smoke detection system shall be installed in rooms, areas, and *walk-in energy storage system units* containing *energy storage systems* as required in Section 608.

4.5 2015 IFC Section 916 (Gas Detection Systems)

Chapter 9 of the 2015 IFC shall be deemed to be amended by the addition of a new Section 916 to read as follows:

SECTION 916 GAS DETECTION SYSTEMS

916.1 Gas detection systems. *Gas detection systems* required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. *Permits* shall be provided in accordance with Section 108 of the *2017 Uniform Code Supplement*.

916.2.1 Construction documents. Documentation of the *gas detection system* design and equipment to be used that demonstrates compliance with the requirements of this code shall be provided with the application for *permit*.

916.3 Equipment. *Gas detection system* equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturer's instructions.

916.4 Power connections. *Gas detection systems* shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an *approved* restraining means that secures the plug to the receptacle.

916.5 Emergency and standby power. Standby or emergency power shall be provided, or the *gas detection system* shall initiate a trouble signal at an *approved* location if the power supply is interrupted.

916.6 Sensor locations. Sensors shall be installed in *approved* locations where leaking gases are expected to accumulate.

916.7 Gas sampling. Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes, in accordance with Section 6004.2.2.7.
3. Where a less frequent or delayed sampling interval is *approved*.

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).
2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a *gas detection system*. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

916.9 Signage. Signs shall be provided adjacent to *gas detection system* alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 Fire alarm system connections. Gas sensors and *gas detection systems* shall not be connected to fire alarm systems unless *approved* and connected in accordance with the fire alarm equipment manufacturer's instructions.

916.11 Inspection, testing and sensor calibration. Inspection and testing of *gas detection systems* shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.

Part 5 – Amendments to the 2015 *International Existing Building Code*

For the purposes of applying the 2015 International Existing Building Code (the “2015 IEBC”) in this State, the 2015 IEBC, certain provisions of which are currently amended by the *2017 Uniform Code Supplement*, shall be deemed to be further amended in the manner specified in this Part 5.

5.1 2015 IEBC Section 202 (Definitions)

Section 202 of the 2015 IEBC, which is currently amended, in part, by Section 9.2 of the *2017 Uniform Code Supplement*, shall be deemed to be further amended by the addition of a definition of the term *energy storage system*, to read as follows:

ENERGY STORAGE SYSTEM. One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

5.2 2015 IEBC Section 303 (Energy Storage Systems)

Chapter 3 of the 2015 IEBC shall be deemed to be amended by the addition of a new Section 303, to read as follows:

SECTION 303 ENERGY STORAGE SYSTEMS

303.1 Energy storage systems. The installation, operation, maintenance, repair, and retrofitting of *energy storage systems* shall be in accordance with Section 608 of the International Fire Code (as amended by the *2019 Energy Storage System Supplement*).