



Date: December 1, 2023
To: City of Houston HPW-HPC
Attention: CCM
From: Jensen Hughes
Subject: IFC Electrical Storage Systems

This technical memo is provided to describe the significant changes to the Houston Construction Codes with regards to the requirements for electrical storage systems.

The addition of energy storage system (ESS) requirements into the 2018 code was an initial effort to address safety hazards associated with the increased use of lithium-ion batteries, capacitors and other modern energy storage system (ESS) technologies for a growing number of energy storage applications.

This section rewrite retains many of the basic protection concepts in the 2018 code, and it also provides customized requirements for different types of installations and different types of ESS technologies. Several revisions have occurred in **Table 1207.1**, which is the table used to determine when **Section 1207** applies to an ESS system. The mobile ESS operations are now addressed in **Section 1207.10**.

Section 1207.1.5 has been revised to specify that the large-scale fire testing shall be conducted in accordance with UL 9540A "Standard for Safety Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems."

Section 1207.1.6 is added to address fire events involving lithium-ion battery systems, since lithium-ion battery fires have the potential to re-ignite hours or even days after initial extinguishment by the fire department. The fire remediation requirements, the owner responsible for sending mitigation personnel to the scene to take over the remediation process.

New requirements in **Section 1207.2** include criteria on commissioning, decommissioning, maintenance and testing requirements. These provisions are important considerations for providing a safe installation.

The ESS equipment is addressed in **Section 1207.3**. New requirements in this section address retrofitting existing energy storage systems and reuse or repurposing of electric vehicle batteries that are converted for ESS use in buildings.

A definition has been added for walk-in units and recognizes ISO type shipping containers being used to house ESS in various outdoor and mobile applications.

Section 1207.5 identifies the specific protection requirements applicable for each type of battery technology. The requirements differ based on the exposure hazard, such as indoor versus outdoor, dedicated use building versus nondedicated use buildings, remote locations or rooftop installations.

Table 1207.5.2 lists the maximum allowable quantity of energy storage allowed in a room or walk-in units. The ESS can only exceed these amounts if justified by a hazard mitigation analysis or large-scale fire testing. Mitigation measures are added to address the increased hazard.

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All ESS rooms and walk-in units must be protected by an automatic fire-extinguishing system. **Section 1207.5.5** now specifies a minimum design density. Additionally, other fire-extinguishing agents and systems are allowed when the design is based on large scale testing in accordance with UL 9540A.

Section 1207.6.3 addresses explosion control in rooms with Lithium-ion battery systems and other electrochemical ESS technologies as they have the potential to rapidly build up potentially explosive atmospheres in the room.

Section 1207.7.1 requires additional protection measures for dedicated use buildings. Dedicated use buildings will typically be utility grid related facilities. In these buildings, the administrative or support operations are the incidental use and are limited to 10 percent of floor area. Dedicated use buildings are classified as Group F-1 and are not limited to the maximum allowable quantities.

Section 1207.7.4 requires that rooms containing ESS be separated from the remainder of the building. The separation must be fire-resistance construction with a minimum of 2-hour rating. The 2018 IFC and IBC allowed Group B, F, M, S and U occupancies to have a 1-hour rating.

Section 1207.10 covers mobile ESS operations. Mobile ESS are regulated at their home facility where it is stored awaiting deployment, and at the location where the mobile ESS provides temporary energy. Deployment and use of mobile ESS is limited to 30 days with some exceptions.

2021 Fire Code Changes –

SECTION 1206 1207
ELECTRICAL ENERGY STORAGE SYSTEMS (ESS)

1207.1 General. The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

Exception: ESS in Group R-3 and R-4 occupancies shall comply with Section 1207.11.

1207.1.1 Scope. ESS having capacities exceeding the values shown in Table 1207.1.1 shall comply with this section.

TABLE 1207.1.1
ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES

<u>TECHNOLOGY</u>	<u>ENERGY CAPACITY^a</u>
<u>Capacitor ESS</u>	<u>3 kWh</u>
<u>Flow batteries^b</u>	<u>20 kWh</u>
<u>Lead-acid batteries, all types</u>	<u>70 kWh^c</u>
<u>Lithium-ion batteries</u>	<u>20 kWh</u>
<u>Nickel metal hydride (Ni-MH)</u>	<u>70 kWh</u>
<u>Nickel-cadmium batteries (Ni-Cd)</u>	<u>70 kWh</u>
<u>Other battery technologies</u>	<u>10 kWh</u>
<u>Other electrochemical ESS technologies</u>	<u>3 kWh</u>

For SI: 1 kilowatt hour = 3.6 megajoules.

- 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 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.
- c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.

1207.1.2 Permits. Permits shall be obtained for ESS as follows:

1. Construction permits shall be obtained for stationary ESS installations and for mobile ESS charging and storage installations covered by Section 1207.10.1. Permits shall be obtained in accordance with Section 105.6.5.
2. Operational permits shall be obtained for stationary ESS installations and for mobile ESS deployment operations covered by Section 1207.10.3. Permits shall be obtained in accordance with Section 105.5.14.

1207.1.2.1 Communication Utilities. Operational permits 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 voltage alternating current (VAC) and 60 voltage direct current (VDC).



1207.1.3 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 ESS is to be installed.
2. Details on the hourly fire-resistance ratings of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) 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 Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.

1207.1.4 Hazard Mitigation Analysis. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.8.2 under any of the following conditions:

1. 1.Where ESS technologies not specifically identified in Table 1207.1 are provided.
2. 2.More than one ESS technology is provided in a room or enclosed area where there is a potential for adverse interaction between technologies.
3. 3.Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2.

1207.1.4.1 Fault Condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

1. 1.A thermal runaway condition in a single ESS rack, module or unit.
2. 2.Failure of any battery (energy) management system.
3. 3.Failure of any required ventilation or exhaust system.
4. 4.Voltage surges on the primary electric supply.
5. 5.Short circuits on the load side of the ESS.
6. 6.Failure of the smoke detection, fire detection, fire suppression or gas detection system.
7. 7.Required spill neutralization not being provided or failure of a required secondary containment system.

1207.1.4.2 Analysis Approval. The fire code official is authorized to approve the hazardous mitigation analysis provided that the consequences of the hazard mitigation analysis demonstrate:

1. 1.Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.

2. 2.Fires in occupied work centers will be detected in time to allow occupants within the room or area to safely evacuate.
3. 3.Toxic and highly toxic gases released during fires will not reach concentrations in excess of the IDLH level in the building or adjacent means of egress routes during the time deemed necessary to evacuate occupants from any affected area.
4. 4.Flammable gases released from ESS during charging, discharging and normal operation will not exceed 25 percent of their lower flammability limit (LFL).
5. 5.Flammable gases released from ESS during fire, overcharging and other abnormal conditions will be controlled through the use of ventilation of the gases, preventing accumulation, or by deflagration venting.

1207.1.4.3 Additional Protection Measures. Construction, equipment and systems that are required for the ESS to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1207, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

1207.1.5 Large-Scale Fire Test. Where required elsewhere in Section 1207, large-scale fire testing shall be conducted on a representative ESS in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for a duration equal to the fire-resistance rating of the room separation specified in Section 1207.7.4. The test report shall be provided to the fire code official for review and approval in accordance with Section 104.8.2.

1207.1.6 Fire Remediation. Where a fire or other event has damaged the ESS and ignition or re-ignition of the ESS is possible, the system owner, agent or lessee shall take the following actions, at their expense, to mitigate the hazard or remove damaged equipment from the premises to a safe location.

1207.1.6.1 Fire Mitigation Personnel. Where, in the opinion of the fire code official, it is essential for public safety that trained personnel be on-site to respond to possible ignition or re-ignition of a damaged ESS, the system owner, agent or lessee shall immediately dispatch one or more fire mitigation personnel to the premise, as required and approved, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the fire code official indicates the public safety hazard has been abated.

1207.1.6.2 Duties. On-duty fire mitigation personnel shall have the following responsibilities:

1. 1.Keep a diligent watch for fires, obstructions to means of egress and other hazards.
2. 2.Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.
3. 3.Take prompt measures for remediation of hazards in accordance with the decommissioning plan per Section 1207.2.3.
4. 4.Take prompt measures to assist in the evacuation of the public from the structures.

1207.2 Commissioning, Decommissioning, Operation and Maintenance. Commissioning, decommissioning, operation and maintenance shall be conducted in accordance with this section.



1207.2.1 Commissioning. Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS 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 ESS 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 ESS.
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 ESS 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 ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for.
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

Exception: 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. A decommissioning plan shall be provided and maintained where required by the fire code official.

1207.2.1.1 Initial Acceptance Testing. During the commissioning process an ESS shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final approval.

1207.2.1.2 Commissioning Report. A report describing the results of the system commissioning, including the results of the initial acceptance testing required in Section 1207.2.1.1, shall be provided to the fire code official prior to final inspection and approval and maintained at an approved on-site location.

1207.2.2 Operation and Maintenance. An operation and maintenance manual shall be provided to both the ESS owner or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:



1. Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the ESS 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 control systems.
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 ESS 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.

The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an approved on-site location.

1207.2.2.1 Ongoing Inspection and Testing. Systems that monitor and protect the ESS installation shall be inspected and tested in accordance with the manufacturer's instructions and the operation and maintenance manual. Inspection and testing records shall be maintained in the operation and maintenance manual.

1207.2.3 Decommissioning. The code official shall be notified prior to the decommissioning of an ESS. Decommissioning shall be performed in accordance with the decommissioning plan that includes the following:

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

1207.3 Equipment. ESS equipment shall be in accordance with Sections 1207.3.1 through 1207.3.9.

1207.3.1 Energy Storage System Listings. ESS 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.

1207.3.2 Equipment Listing. Chargers, inverters, and energy storage management systems shall be covered as part of the UL 9540 listing or shall be listed separately.

1207.3.3 Utility Interactive Systems. Inverters shall be listed and labeled in accordance with UL 1741. 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.



1207.3.4 Energy Storage Management System. Where required by the ESS listing, an approved energy storage management system that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications shall be provided. The system shall disconnect electrical connections to the ESS 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.

1207.3.5 Enclosures. Enclosures of ESS shall be of noncombustible construction.

1207.3.6 Repairs. Repairs of ESS shall only be done by qualified personnel. Repairs with other than identical parts shall be considered retrofitting and comply with Section 1207.3.7. Repairs shall be documented in the service records log.

1207.3.7 Retrofits. Retrofitting of an existing ESS shall comply with the following:

1. A construction permit shall be obtained in accordance with Section 105.6.5.
2. New batteries, battery modules, capacitors and similar ESS components shall be listed.
3. Battery management 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 1207.2.1.
6. Retrofits shall be documented in the service records log.

1207.3.7.1 Retrofitting Lead Acid And Nickel Cadmium. Section 1207.3.7 shall not apply to 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.

1207.3.8 Replacements. Replacements of ESS shall be considered new ESS installations and shall comply with the provisions of Section 1207 as applicable to new ESS. The ESS being replaced shall be decommissioned in accordance with Section 1207.2.3.

1207.3.9 Reused and repurposed equipment. Equipment and materials shall only be reused or reinstalled as permitted in Section 104.8.1. Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be reused in applications regulated by Chapter 12 unless approved by the fire code official and unless the equipment is refurbished by a battery refurbishing company approved in accordance with UL 1974.

1207.4 General Installations Requirements. Stationary and mobile ESS shall comply with the requirements of Sections 1207.4.1 through 1207.4.12.

1207.4.1 Electrical Disconnects. Where the ESS 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.

1207.4.2 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.

1207.4.3 Fire-Resistance-Rated Separations. Rooms and other indoor areas containing ESS shall be separated from other areas of the building in accordance with Section 1207.7.4. ESS shall be permitted to be in the same room with the equipment they support.

1207.4.4 Seismic and Structural Design. Stationary ESS 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.

1207.4.5 Vehicle Impact Protection. Where ESS are subject to impact by a motor vehicle, including forklifts, vehicle impact protection shall be provided in accordance with Section 312.

1207.4.6 Combustible Storage. Combustible materials shall not be stored in ESS rooms, areas or walk-in units. Combustible materials in occupied work centers covered by Section 1207.4.10 shall be stored at least 3 feet (914 mm) from ESS cabinets.

1207.4.7 Toxic and Highly Toxic Gases. ESS 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.

1207.4.8 Signage. Approved signs shall be provided on or adjacent to all entry doors for ESS rooms or areas and on enclosures of ESS cabinets and walk-in units located outdoors on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. 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 ESS technology present.
3. "ENERGIZED ELECTRICAL CIRCUITS."
4. Where water-reactive electrochemical ESS 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 1207.1.6.1.

Exception: Existing electrochemical ESS shall be permitted to include the signage required at the time they were installed.

1207.4.9 Security of Installations. Rooms, areas and walk-in units in which electrochemical ESS 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 ESS and its components.

1207.4.10 Occupied Work Centers. Electrochemical ESS 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 ESS located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.
2. Where electrochemical ESS 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 1207.4.8.

1207.4.11 Open Rack Installations. Where electrochemical ESS 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 for ease of maintenance.

1207.4.12 Walk-In Units. Walk-in units shall be entered only for inspection, maintenance and repair of ESS units and ancillary equipment, and shall not be occupied for other purposes.

1207.5 Electrochemical ESS Protection. The protection of electrochemical ESS shall be in accordance with Sections 1207.5.1 through 1207.5.8 where required by Sections 1207.7 through 1207.10.

**TABLE 1207.5
MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS.**

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

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

1207.5.1 Size And Separation. Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

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 is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

1207.5.2 Maximum Allowable Quantities. Fire areas within rooms, areas and walk-in units containing electrochemical ESS shall not exceed the maximum allowable quantities in Table 1207.5.

Exceptions:

1. Where approved by the fire code official, rooms, areas and walk-in units containing electrochemical ESS that exceed the amounts in Table 1207.5 shall be permitted based on a hazardous mitigation analysis in accordance with Section 1207.1.4 and large-scale fire testing complying with Section 1207.1.5.
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 1207.7.1.

1207.5.2.1 mixed Electrochemical Energy Systems. Where rooms, areas and walk-in 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.

1207.5.3 Elevation. Electrochemical ESS 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.
2. Where the floor is located below the lowest level of exit discharge.
- 3. Exceptions:**
4. 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.
5. Where approved, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
6. Where approved by the fire code official, installations shall be permitted on higher and lower floors.

1207.5.4 Fire Detection. An approved automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. 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 transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where approved to a constantly attended location.

1207.5.4.1 System Status. Where required by the fire code official, visible annunciation shall be provided on cabinet exteriors or in other approved locations to indicate that potentially hazardous conditions associated with the ESS exist.

1207.5.5 Fire Suppression Systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS 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 (1.14 L/min) based on the fire area or 2,500 square-foot (232 m²) design area, whichever is smaller.
2. Where approved, an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification based on large-scale fire testing complying with Section 1207.1.5.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is approved by the fire code official based on large-scale fire testing complying with Section 1207.1.5:
 - 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.

1207.5.5.1 Water-Reactive Systems. Electrochemical ESS that utilize water-reactive materials shall be protected by an approved alternative automatic fire extinguishing system in accordance with Section 904, where the installation is approved by the fire code official based on large-scale fire testing complying with Section 1207.1.5.

1207.5.6 Maximum Enclosure Size. Outdoor walk-in units housing ESS shall not exceed 53 feet by 8 feet by 9.5 feet high (16 154 mm × 2438 mm × 2896 mm), not including bolt-on HVAC and related equipment, as approved. Outdoor walk-in units exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 1207.7.

1207.5.7 Vegetation Control. Areas within 10 feet (3048 mm) on each side of outdoor ESS 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 cover shall be permitted to be exempt provided that they do not form a means of readily transmitting fire.

1207.5.8 Means of Egress Separation. ESS located outdoors and in open parking garages shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

Exception: The fire code official is authorized to approve a reduced separation distance if large-scale fire testing complying with Section 1207.1.5 is provided that shows that a fire involving the ESS will not adversely impact occupant egress.



1207.6 Electrochemical ESS Technology Specific Protection. Electrochemical ESS installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 1207.6.

**TABLE 1207.6
ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS**

COMPLIANCE REQUIRED^b		BATTERY TECHNOLOGY				OTHER ESS AND BATTERY TECHNOLOGIES	CAPACITORS AND ESS^b
Feature	Section	Lead-acid	Ni-Cd and Ni-MH	Lithium -ion	Flow	^b	
<u>Exhaust ventilation</u>	<u>1207.6.1</u>	<u>Yes</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>
<u>Explosion control</u>	<u>1207.6.3</u>	<u>Yes^a</u>	<u>Yes^a</u>	<u>Yes</u>	<u>No</u>	<u>Yes</u>	<u>Yes</u>
<u>Safety caps</u>	<u>1207.6.4</u>	<u>Yes</u>	<u>Yes</u>	<u>No</u>	<u>No</u>	<u>Yes</u>	<u>Yes</u>
<u>Spill control and neutralization</u>	<u>1207.6.2</u>	<u>Yes^c</u>	<u>Yes^c</u>	<u>No</u>	<u>Yes</u>	<u>Yes</u>	<u>Yes</u>
<u>Thermal runaway</u>	<u>1207.6.5</u>	<u>Yes^d</u>	<u>Yes</u>	<u>Yes^e</u>	<u>No</u>	<u>Yes^e</u>	<u>Yes</u>

- 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 in accordance with Section 104.8.2 that provides justification why the protection is not necessary based on the technology used.
- c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
- d. Not required for vented-type (i.e., flooded) lead-acid batteries.
- e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.

1207.6.1 Exhaust Ventilation. Where required by Table 1207.6 or elsewhere in this code, exhaust ventilation of rooms, areas and walk-in units containing electrochemical ESS shall be provided in accordance with the International Mechanical Code and Section 1207.6.1.1 or 1207.6.1.2.

1207.6.1.1 Ventilation Based on 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 unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

1207.6.1.2 Ventilation Based on 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 unit. The ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 1207.6.1.2.4.



1207.6.1.2.1 Standby Power. Mechanical exhaust ventilation shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.

1207.6.1.2.2 Installation Instructions. Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer's installation instructions and the International Mechanical Code.

1207.6.1.2.3 Supervision. Required mechanical exhaust ventilation systems shall be supervised by an approved central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible signal at an approved constantly attended on-site location.

1207.6.1.2.4 Gas Detection System. Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an approved continuous gas detection system that complies with Section 916 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 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 Section 1203.2.5.
4. Failure of the gas detection system shall annunciate a trouble signal at an approved central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible trouble signal at an approved constantly attended on-site location.

1207.6.2 Spill Control and Neutralization. Where required by Table 1207.6 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.

1207.6.2.1 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.

1207.6.2.2 Neutralization. An approved method that is capable of neutralizing spilled liquid electrolyte from the largest battery or vessel to a pH between 5.0 and 9.0 shall be provided.

1207.6.2.3 Communications Utilities. The requirements of Section 1207.6.2 shall apply only when 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.



1207.6.3 Explosion Control. Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas or walk-in units containing electrochemical ESS technologies.

Exceptions:

1. Where approved, explosion control is permitted to be waived by the fire code official based on large-scale fire testing complying with Section 1207.1.5 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules where tested in accordance with UL 9540A.
2. Where approved, explosion control is permitted to be waived by the fire code official based on documentation provided in accordance with Section 104.7 that demonstrates that the electrochemical ESS 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 unit or structure under thermal runaway or other fault conditions.

1207.6.4 Safety Caps. Where required by Table 1207.6 or elsewhere in this code, vented batteries and other ESS shall be provided with flame-arresting safety caps.

1207.6.5 Thermal Runaway. Where required by Table 1207.6 or elsewhere in this code, batteries and other ESS shall be provided with a listed device or other approved method to prevent, detect and minimize the impact of thermal runaway.

1207.7 Indoor Installations. Indoor ESS installations shall be in accordance with Sections 1207.7.1 through 1207.7.4.

**TABLE 1207.7
INDOOR ESS INSTALLATIONS**

COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS^a	NONDEDICATED-USE BUILDINGS^b
Feature	Section		
<u>Dwelling units and sleeping units</u>	<u>1207.7.3</u>	<u>NA</u>	<u>Yes</u>
<u>Elevation</u>	<u>1207.5.3</u>	<u>Yes</u>	<u>Yes</u>
<u>Fire suppression systems</u>	<u>1207.5.5</u>	<u>Yes^c</u>	<u>Yes</u>
<u>Fire-resistance-rated separations</u>	<u>1207.7.4</u>	<u>Yes</u>	<u>Yes</u>
<u>General installation requirements</u>	<u>1207.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Maximum allowable quantities</u>	<u>1207.5.2</u>	<u>No</u>	<u>Yes</u>
<u>Size and separation</u>	<u>1207.5.1</u>	<u>Yes</u>	<u>Yes</u>
<u>Smoke and automatic fire detection^e</u>	<u>1207.5.4</u>	<u>Yes^d</u>	<u>Yes</u>
<u>Technology specific protection</u>	<u>1207.6</u>	<u>Yes</u>	<u>Yes</u>

NA = Not Allowed.

a. See Section 1207.7.1.

b. See Section 1207.7.2.

- c. 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.
- d. Where approved by the fire code official, alarm signals are not required to be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or a constantly attended location where local fire alarm annunciation is provided and trained personnel are always present.
- e. Lead-acid and nickel-cadmium battery systems installed in Group U buildings and structures less than 1,500 square feet (139 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.

1207.7.1 Dedicated-Use Buildings. For the purpose of Table 1207.7, dedicated-use ESS buildings shall be classified as Group F-1 occupancies and comply with all the following:

- 1. The building shall only be used for ESS, electrical energy generation and other electrical grid-related operations.
- 2. Occupants in the rooms and areas containing ESS are limited to personnel that operate, maintain, service, test and repair the ESS and other energy systems.
- 3. No other occupancy types shall be permitted in the building.
- 4. Administrative and support personnel shall be permitted in areas within the buildings that do not contain ESS, provided that:
 - 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 incidental use areas to the public way that does not require occupants to traverse through areas containing ESS or other energy system equipment.

1207.7.2 Nondedicated-Use Buildings. For the purpose of Table 1207.7, nondedicated-use buildings include all buildings that contain ESS and do not comply with Section 1207.7.1 dedicated-use building requirements.

1207.7.3 Dwelling Units and Sleeping Units. ESS shall not be installed in sleeping units or in habitable spaces of dwelling units.

1207.7.4 Fire-Resistance-Rated Separations. Rooms and areas containing ESS shall include fire-resistance-rated separations as follows:

- 1. In dedicated-use buildings, rooms and areas containing ESS shall be separated from areas in which administrative and support personnel are located.
- 2. In nondedicated-use buildings, rooms and areas containing ESS shall be separated from other areas in the building.

Separation shall be provided by 2-hour fire barriers constructed in accordance with Section 707 of the International Building Code and 2-hour horizontal assemblies constructed in accordance with Section 711 of the International Building Code, as appropriate.

1207.8 Outdoor Installations. Outdoor installations shall be in accordance with Sections 1207.8.1 through 1207.8.3. Exterior wall installations for individual ESS units not exceeding 20 kWh shall be in accordance with Section 1207.8.4.

**TABLE 1207.8
OUTDOOR ESS INSTALLATIONS^a**

COMPLIANCE REQUIRED		REMOTE INSTALLATIONS^a	INSTALLATIONS NEAR EXPOSURES^b
Feature	Section		
<u>All ESS installations</u>	<u>1207.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Clearance to exposures</u>	<u>1207.8.3</u>	<u>Yes</u>	<u>Yes</u>
<u>Fire suppression systems</u>	<u>1207.5.5</u>	<u>Yes^c</u>	<u>Yes</u>
<u>Maximum allowable quantities</u>	<u>1207.5.2</u>	<u>No</u>	<u>Yes</u>
<u>Maximum enclosure size</u>	<u>1207.5.6</u>	<u>Yes</u>	<u>Yes</u>
<u>Means of egress separation</u>	<u>1207.5.8</u>	<u>Yes</u>	<u>Yes</u>
<u>Size and separation</u>	<u>1207.5.1</u>	<u>No</u>	<u>Yes^d</u>
<u>Smoke and automatic fire detection</u>	<u>1207.5.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Technology-specific protection</u>	<u>1207.6</u>	<u>Yes</u>	<u>Yes</u>
<u>Vegetation control</u>	<u>1207.5.7</u>	<u>Yes</u>	<u>Yes</u>

a. See Section 1207.8.1.

b. See Section 1207.8.2.

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

d. In outdoor walk-in units, spacing is not required between ESS units and the walls of the enclosure.

1207.8.1 Remote Outdoor Installations. For the purpose of Table 1207.8, remote outdoor installations include ESS located more than 100 feet (30 480 mm) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.

1207.8.2 Installations Near Exposures. For the purpose of Table 1207.8, installations near exposures include all outdoor ESS installations that do not comply with Section 1207.8.1 remote outdoor location requirements.

1207.8.3 Clearance to Exposures. ESS located outdoors shall be separated by a minimum of 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 stock.
7. Other exposure hazards.

Exceptions:



1. Clearances 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 (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS 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 with no openings or combustible overhangs are provided on the wall adjacent to the ESS and the fire-resistance rating of the exterior wall is a minimum of 2 hours.
3. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, 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 1207.1.5.

1207.8.4 Exterior Wall Installations. ESS 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 ESS units shall not exceed 20 kWh.
2. The ESS shall comply with applicable requirements in Section 1207.
3. The ESS shall be installed in accordance with the manufacturer's instructions and their listing.
4. Individual ESS units shall be separated from each other by at least 3 feet (914 mm).
5. The ESS shall be separated from doors, windows, operable openings into buildings or HVAC inlets by at least 5 feet (1524 mm).

Exception: Where approved, smaller separation distances in Items 4 and 5 shall be permitted based on large-scale fire testing complying with Section 1207.1.5.

1207.9 Special Installations. Rooftop and open parking garage ESS installations shall comply with Sections 1207.9.1 through 1207.9.6.

**TABLE 1207.9
SPECIAL ESS INSTALLATIONS.**

<u>COMPLIANCE REQUIRED</u>		<u>ROOFTOPS^a</u>	<u>OPEN PARKING GARAGES^b</u>
<u>Feature</u>	<u>Section</u>		
<u>All ESS installations</u>	<u>1207.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Clearance to exposures</u>	<u>1207.9.3</u>	<u>Yes</u>	<u>Yes</u>
<u>Fire suppression systems</u>	<u>1207.9.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Maximum allowable quantities</u>	<u>1207.5.2</u>	<u>Yes</u>	<u>Yes</u>
<u>Maximum enclosure size</u>	<u>1207.5.6</u>	<u>Yes</u>	<u>Yes</u>
<u>Means of egress separation</u>	<u>1207.5.8</u>	<u>Yes</u>	<u>Yes</u>
<u>Open parking garage installations</u>	<u>1207.9.6</u>	<u>Yes</u>	<u>Yes</u>
<u>Rooftop installations</u>	<u>1207.9.5</u>	<u>Yes</u>	<u>Yes</u>
<u>Size and separation</u>	<u>1207.5.1</u>	<u>Yes</u>	<u>Yes</u>



<u>Smoke and automatic fire detection</u>	<u>1207.5.4</u>	<u>Yes</u>	<u>Yes</u>
<u>Technology-specific protection</u>	<u>1207.6</u>	<u>Yes</u>	<u>Yes</u>

- a. See Section 1207.9.1.
- b. See Section 1207.9.2.

1207.9.1 Rooftop Installations. For the purpose of Table 1207.9, rooftop ESS installations are those located on the roofs of buildings.

1207.9.2 Open Parking Garage Installations. For the purpose of Table 1207.9, open parking garage ESS installations are those located in a structure or portion of a structure that complies with Section 406.5 of the International Building Code.

1207.9.3 Clearance to Exposures. ESS located on rooftops and in open parking garages shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop ESS 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 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 (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, 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 1207.1.5.

1207.9.4 Fire Suppression Systems. ESS located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the ESS enclosure in accordance with Section 1207.5.5. Areas containing ESS other than walk-in 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 1207.5.5.

Exception: A fire suppression system is not required in open parking garages if large-scale fire testing complying with Section 1207.1.5 is provided that shows that a fire will not impact the exposures in Section 1207.9.3.

1207.9.5 Rooftop Installations. ESS 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. ESS 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 (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from an ESS 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 ESS shall be the minimum of 10 feet (3048 mm) from the fire service access point on the rooftop.

1207.9.6 Open Parking Garages. ESS and associated equipment that are located in open parking garages shall comply with all of the following:

1. ESS shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.
 - a. Exception: This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.
2. ESS shall not be located within 25 feet (7620 mm) of exits leading from the attached building 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 (1524 mm) from the outer enclosure of the ESS.

1207.10 Mobile ESS Equipment and Operations. Mobile ESS equipment and operations shall comply with Sections 1207.10.1 through 1207.10.7.7.

**TABLE 1207.10
MOBILE ENERGY STORAGE SYSTEMS (ESS)**

<u>COMPLIANCE REQUIRED</u>		<u>DEPLOYMENT^a</u>
<u>Feature</u>	<u>Section</u>	
<u>All ESS installations</u>	<u>1207.4</u>	<u>Yes^b</u>
<u>Fire suppression systems</u>	<u>1207.5.5</u>	<u>Yes^c</u>
<u>Maximum allowable quantities</u>	<u>1207.5.2</u>	<u>Yes</u>
<u>Maximum enclosure size</u>	<u>1207.5.6</u>	<u>Yes</u>
<u>Means of egress separation</u>	<u>1207.5.8</u>	<u>Yes</u>



<u>Size and separation</u>	<u>1207.5.1</u>	<u>Yes^d</u>
<u>Smoke and automatic fire detection</u>	<u>1207.5.4</u>	<u>Yes^e</u>
<u>Technology-specific protection</u>	<u>1207.6</u>	<u>Yes</u>
<u>Vegetation control</u>	<u>1207.5.7</u>	<u>Yes</u>

- a. See Section 1207.10.2.
- b. Mobile operations on wheeled vehicles and trailers shall not be required to comply with Section 1207.4.4 seismic and structural load requirements.
- c. Fire suppression system connections to the water supply shall be permitted to use approved temporary connections.
- d. In walk-in units, spacing is not required between ESS units and the walls of the enclosure.
- e. Alarm signals are not required to be transmitted to an approved location for mobile ESS deployed 30 days or less.

1207.10.1 Charging and Storage. For the purpose of Section 1207.10, charging and storage covers the operation where mobile ESS are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.

1207.10.2 Deployment. For the purpose of Section 1207.10, deployment covers operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.

1207.10.3 Permits. Construction and operational permits shall be provided for charging and storage of mobile ESS and operational permits shall be provided for deployment of mobile ESS as required by Section 1207.1.2.

1207.10.4 Construction Documents. Construction documents complying with Section 1207.1.3 shall be provided with the construction permit application for mobile ESS charging and storage locations.

1207.10.4.1 Deployment Documents. The following information shall be provided with the operation permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the construction documents required by Section 1207.1.3.
2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking signs.
4. Description of fencing to be provided around the ESS, 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. For deployment, the intended duration of 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 1207.10.7.5.
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 1207.1.6.1.

1207.10.5 Approved Locations. Locations where mobile ESS are charged, stored and deployed shall be restricted to the locations established on the construction and operational permits.

1207.10.6 Charging and Storage. Installations where mobile ESS are charged and stored shall be treated as permanent ESS indoor or outdoor installations, and shall comply with the following sections, as applicable:

1. Indoor charging and storage shall comply with Section 1207.7.
2. Outdoor charging and storage shall comply with Section 1207.8.
3. Charging and storage on rooftops and in open parking garages shall comply with Section 1207.9.

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.

1207.10.7 Deployed Mobile Ess Requirements. Deployed mobile ESS equipment and operations shall comply with this section and Table 1207.10.

1207.10.7.1 Duration. The duration of mobile ESS deployment shall not exceed 30 days.

Exceptions:

1. Mobile ESS deployments that provide power for durations longer than 30 days shall comply with Section 1207.10.6.
2. Mobile ESS deployments shall not exceed 180 days unless additional operational permits are obtained.

1207.10.7.2 Restricted Locations. Deployed mobile ESS operations shall not be located indoors, in covered parking garages, on rooftops, below grade or under building overhangs.

1207.10.7.3 Clearance to Exposures. Deployed mobile ESS shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Public ways.
2. Buildings.
3. Stored combustible materials.
4. Hazardous materials.
5. High-piled storage.



6. Other exposure hazards.

Deployed mobile ESS shall be separated by a minimum of 50 feet (15 240 mm) from public seating areas and from tents, canopies, and membrane structures with an occupant load of 30 or more.

1207.10.7.4 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.

1207.10.7.5 Local Staging. Mobile ESS 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 1 hour during transit, unless specifically approved by the fire code official when the permit is issued.

1207.10.7.6 Fencing. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of a deployed mobile ESS.

1207.10.7.7 Smoking. Smoking shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.

1207.11 ESS In Group R-3 And R-4 Occupancies. ESS in Group R-3 and R-4 occupancies shall be installed and maintained in accordance with Sections 1207.11.1 through 1207.11.9. The temporary use of an owner or occupant's electric-powered vehicle as an ESS shall be in accordance with Section 1207.11.10.

1207.11.1 Equipment Listings. ESS shall be listed and labeled in accordance with UL 9540. ESS 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. ESS less than 1 kWh (3.6 megajoules).

1207.11.2 Installation. ESS shall be installed in accordance with the manufacturer's instructions and their listing.

1207.11.2.1 Spacing. Individual units shall be separated from each other by at least 3 feet (914 mm) of spacing unless smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.5.

1207.11.3 Location. ESS shall be installed only 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 406.3.2 of the International Building Code.
3. Outdoors on exterior walls located a minimum of 3 feet (914 mm) from doors and windows.
4. Utility closets and storage or utility spaces within dwelling units and sleeping units.

1207.11.4 Energy Ratings. Individual ESS units shall have a maximum rating of 20 kWh. The aggregate rating structure 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.

1207.11.5 Electrical Installation. ESS 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.

1207.11.6 Fire Detection. Rooms and areas within dwellings units, sleeping units and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11. A heat detector 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.

1207.11.7 Protection from Impact. Stationary storage battery systems installed in a location subject to vehicle damage shall be protected by approved barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the International Mechanical Code.

1207.11.8 Ventilation. Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 1207.6.1.

1207.11.9 Toxic and Highly Toxic Gas. ESS 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 or R-4 occupancies.

1207.11.10 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.