



SAN JUAN COUNTY DEPARTMENT OF COMMUNITY DEVELOPMENT
OFFICE OF THE SAN JUAN COUNTY FIRE MARSHAL
 135 Rhone Street, PO Box 947, Friday Harbor, WA 98250
 (360) 378-3473 (FIRE) | (360) 378-2354
 firemarshal@sanjuanco.com | www.sanjuanco.com



FIRE CONSTRUCTION PERMIT SUBMITTAL CHECKLIST

BATTERY STORAGE SYSTEMS

PROJECT INFORMATION	
Site Address & Parcel #:	Associated Permits:
Project Name / Tenant:	Property Owner:

Electronic File Standards

File Naming Standard: Electronic plans and documents shall be named as specified in bold type under “permitting requirements”. For example, the seating plan must be named “Seating Plan”.

Acceptable File Types: Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Document Orientation: All plans must be uploaded in “Landscape” format in the horizontal position. All other documents can be in “portrait” format.

CODE EDITIONS
<ul style="list-style-type: none"> ○ 2018 Washington State Fire and Building Code
PERMITTING REQUIREMENTS
<ul style="list-style-type: none"> ○ An IFC fire installation permit is required to install a battery system in a building or space. A permit is required for installation, operation of, or modification to battery systems and related equipment. A permit is required when values exceed what is shown in Table 1206.2 (2018 IFC)



**TABLE 1206.2
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES**

BATTERY TECHNOLOGY	CAPACITY ^a
Flow Batteries ^b	20kWh
Lead Acid, All Types	70kWh
Lithium, All Types	20kWh
Nickel Cadmium (Ni-Cd)	70 kWh
Sodium, All Types	20 kWh ^c
Other Battery Technologies	10 kWh

For SI:1 kilowatt hour = 3.6 megajoules

- a. For batteries 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. 70 kWh for sodium-ion technologies.

The following information is required at time of application for the Fire Construction Permit:

- Completed **Fire Construction Permit Application**
- Completed **“Battery Storage Systems” -submittal checklist**. Check all checkboxes that are applicable to your project.
- Site Plan**. Will there be Outdoor Installations? If so, show how you are meeting 1206.2.8.7 through 1206.2.8.7.4.
- Plans**. Location and layout diagram of the room in which the stationary storage battery system is to be installed. All information specified under 1206.2.2 shall be provided on construction documents. Show compliance with 1206.2.8.1 through 1206.2.8.6.2.
- Manufacturer’s **cut sheets** for batteries, battery rack, chargers, and inverters.
- Spill Control and Neutralization per 1206.2.11.5 and method of spill control and neutralization as required by 1206.2.12.
- Hazard Mitigation Analysis**. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:
 - Battery technologies not specifically identified in Table 1206.2 are provided.
 - More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
 - Where allowed as a basis for increasing maximum allowable quantities in accordance with Section 1206.2.9.



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PLANS

The following is a list of information required on all plan submittals for review of a battery system permit. The plan shall be drawn to 1/8"=1'-0" minimum scale. The applicant is required to submit all of the following information so an accurate and timely review may be done:

- Declare the type and size of each stationary storage battery system per table 1206.2
- Building layout showing location and arrangement of battery systems
- All rated wall, floor, and ceiling assemblies
- Location of equipment used for fire-extinguishing systems
- Location of equipment used for smoke detection systems
- Location of equipment used for ventilation systems
- Location of all required signage
- Rack Storage arrangement, including Seismic and Structural Design IFC 1206.2.4
- Location of Required Electrical Disconnects per 1206.2.8.6.1 and NFPA 70
- Safety caps.** Vented batteries shall be provided with flame-arresting safety caps per 2018 IFC 1206.2.10.6
- Thermal runaway.** Where required by Section 1206.2.12, storage batteries shall be provided with a listed device or other approved method to prevent, detect, and control thermal runaway per 1206.2.10.7
- Are there fire areas that exceed Maximum Allowable Quantities (MAQ) **1206.2.9 Maximum allowable quantities.** *Fire Areas* within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 1206.2.9 shall comply with all applicable Group H occupancy requirements in this code and the *International Building Code*.
 - Exception:** Where approved by the *fire code official*, areas containing stationary storage batteries that exceed the amounts in Table 1206.2.9 shall be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with Section 1206.2.3 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.
- 1206.2.9.1 Mixed battery systems.** Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a Group H occupancy in accordance with Table 1206.2.9.



PLANS, CONTINUED

TABLE 1206.2.9

MAXIMUM ALLOWABLE BATTERY QUANTITIES

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES	GROUP H OCCUPANCY
Flow Batteries ^b	600 kWh	Group H-2
Lead-Acid, all types	Unlimited	Not Applicable
Lithium, all types	600 kWh	Group H-2
Nickel-cadmium (Ni-Cd)	Unlimited	Not Applicable
Sodium, all types	600 kWh	Group H-2
Other battery technologies	200 kWh	Group H-2 ^c

For batteries rated in amp-hours, Kilowatt-hours (kWh) shall equal rated battery voltage times the amp-hour rating divided by 1,000.

Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.

Shall be a Group H-4 occupancy if the *Fire Code Official* determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard.

Room Design and Construction:

- Battery Systems used for facility standby power, emergency power or uninterrupted power supplies shall have the following separations (IFC 1206.2; IBC Table 509)
 - 1 Hour fire barriers and floor/ceiling assemblies in Group B, F, M, S, and U occupancies
 - 2 Hour fire barriers and floor/ceiling assemblies in Group A, E, I, and R occupancies
- Battery systems are permitted to be in the same room with the equipment they support. IFC 1206.2.8.2
- When stationary battery systems are installed in a separate equipment room accessible only to authorized personnel, they are allowed to be installed on an open rack for ease of maintenance. IFC 1206.2.8.4
- When battery system is situated in an occupied work center, it shall be allowed to be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel. IFC 1206.2.8.5
- When stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet of the equipment they support. IFC 1206.2.8.5.1.



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PLANS, CONTINUED

Spill Control and Neutralization:

- An approved method and materials for the control and neutralization of a spill of electrolyte or other hazardous materials shall be provided in areas containing stationary storage battery systems per 1206.2.11.5
- For battery systems with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of total capacity from the largest cell or block to a pH between 5.0 and 9.0. IFC 1206.2.11.5
- For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3 percent of the capacity of the largest cell or block in the room to a pH between 5.0. and 9.0 IFC 1206.2.11.5.
 - **Exception:** Lithium-ion batteries shall not require neutralization. IFC 1206.2.12.3

Room Ventilation:

- Ventilation shall be provided in accordance with the International Mechanical Code (IMC) and the following (IFC 1206.2.11.3)
 - The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25% of the lower flammability limit, or for hydrogen, 1.0 percent of the total volume of the room; **or**
 - Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot of floor area, but not less than 150 cfm (4 m³/min).
 - **The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.**
- **1206.2.11.3.2 Supervision.** Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an *approved* central station, proprietary or remote station service or shall initiate an audible and visual signal at an *approved* constantly attended on-site location.
 - **Exception:** Lithium-ion batteries shall not require ventilation. IFC 1206.2.12.3



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PLANS, CONTINUED

Cabinet Ventilation:

- **1206.2.11.3.1 Cabinet ventilation.** Where cabinets located in occupied spaces contain storage batteries that are required by Section 1206.2.3 or 1206.2.12 to be provided with ventilation, the cabinet shall be provided with ventilation in accordance with Section 1206.2.11.3
- **1206.2.11.3.2 Supervision.** Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an *approved* central station, proprietary or remote station service or shall initiate an audible and visual signal at an *approved* constantly attended on-site location.

Signage:

- Approved signs shall be provided on doors or in locations near entrances to stationary storage battery system rooms and shall include the following or equivalent:
 - The room contains energized battery systems.
 - The room contains energized electrical circuits.
 - The additional markings required in Section 1206.2.12 for the types of storage batteries contained within the room. (IFC 1206.2.8.6)
- Cabinets shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical, chemical, and fire hazards. (IFC 1206.2.8.6)
 - **Exception:** Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

Seismic and Structural Design:

- Stationary storage battery 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.

Smoke Detection:

- An approved automatic smoke detection system shall be installed in accordance with IFC Section 907.2 in rooms containing stationary battery systems (IFC 1206.2.11.2)



PLANS, CONTINUED

Fire Extinguishing System:

- Shall be equipped with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1. (IFC 1206.2.11.1)
 - **1206.2.11.1.1. Alternative fire-extinguishing systems.** Battery systems that utilize water-reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement, and quantities of storage batteries in the room. The *Fire Code Official* shall be permitted to approve the alternative fire extinguishing system based on full-scale fire and fault condition testing conducted or witnessed and reported by an *approved* laboratory.

INSTALLATION AND INSPECTION REQUIREMENTS

General Requirements

- Ventilation System shall be operational, per approved design. Documentation shall be onsite.

Identification

- Doors into rooms or buildings containing Stationary Battery systems shall be provided with approved signs stating, "This Room Contains Battery Storage System(s)", This Room Contains a "_____" Battery Storage System; "This building is equipped with a Stationary Battery Storage system."
- Buildings equipped with Battery Storage systems shall have signage at fire alarm panel that states, "This building is equipped with a Stationary Battery Storage system." And label/state its location in the building.

Fire Alarm Monitoring

- Smoke detection shall be connected to Bldg FACP for Alarm, Trouble, Supervisory signals.
- If a Gas Detection System is required, it shall be monitored by Bldg Fire Alarm System
- Is there an Energy Management System required for this site? If so, then the required alarm signals per system design and code shall be transmitted to an approved location. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.
- The ventilation system shall report to monitoring unless there is an onsite 24/7 personnel.



FINAL INSPECTION CHECKLIST

- Smoke Detection in Battery area shall be tested and inspected (by permit)
- Fire Suppression System shall have been tested and inspected (by permit)
- Gas Detection System (if installed) shall be tested and inspected including:
 - **1206.2.11.4.1 System Activation.** Activation of the gas detection system shall result in all the following:
 1. Initiation of distinct audible and visible alarms in the battery storage room
 2. Transmission of an alarm to an approved location
 3. De-energizing of the battery charger
 4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system
 - **Exception:** Lead-acid and nickel-cadmium stationary storage battery systems shall not be required to comply with Items 1,2, and 3.
- Proper signage near fire alarm panel and on doorway to equipment
- Site plan posted near fire alarm control panel
- Alarm signals confirmed with central station
- Is Spill Control and Neutralization (if required) in place?

MAINTENANCE

1206.2.7 Testing, maintenance, and repair.

Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management systems, other storage batteries and other safety systems. Introducing other types of storage batteries into the stationary storage battery system or other types of electrolytes into flow battery systems shall be treated as a new installation and require approval by the *Fire Code Official* before the replacements are introduced into service.