

5.12 Energy Storage Systems in R-3 Occupancies (2022) – Updated 11-10-2024

Reference: 2022 California Fire Code Supplement Section 1207 (Effective 7-1-2024), 2022 California Residential Code, Section R302.6

Purpose: To provide guidance and clarify requirements to satisfy the 2022 California Fire Code Supplement Section 1207.11 and CSFM Information Bulletin 21-004

Scope: This bulletin applies to the installation of energy storage systems (ESS) in R-3 occupancies not exceeding the maximum energy ratings of individual ESS units and installation location(s) per 2022 CFC Section 1207.11.4 (Supplement), as summarized below:

Section 1207.11.4 – Energy Ratings:

Individual ESS units shall have a maximum rating of 20 kWh. The ratings of the ESS in each location shall not exceed the ratings in 2022 CFC, Table 1207.11.4 below.

The total aggregate ratings of ESS on the property shall not exceed 600 kWh.

TABLE 1207.11.4 MAXIMUM AGGREGATE RATINGS OF ESS

LOCATION	MAXIMUM AGGREGATE RATINGS (kWh)	INSTALLATION REQUIREMENTS
Within utility closets, basements, and storage or utility spaces located within dwellings	40	
In attached garages	80	
On or within 3 feet of exterior walls of dwellings and attached garages	100	
On or within 3 feet of exterior walls of dwellings and attached garages	200	Exterior walls and eaves are constructed with noncombustible surfaces. ^a
In detached garages and detached accessory structures	200	
In detached garages and detached accessory structures	600	Detached garage or detached accessory structure is a minimum 10 feet away from property lines and dwellings.
Outdoors on the ground	200	ESS is a minimum 3 feet away from property lines and dwellings.
Outdoors on the ground	600	ESS is a minimum 10 feet away from property lines and dwellings.

For SI: 1 foot = 304.8 mm

a. Noncombustible wall surface shall extend in accordance with all the following:

1. A minimum of 5 feet horizontally from the edge of the ESS.
2. A minimum of 1 foot vertically below the bottom edge of the ESS.
3. A minimum of 8 feet vertically above the ESS, or to a noncombustible eave, whichever is less.

The code official is authorized to approve reductions of installation requirements based on large-scale fire testing complying with Section 1207.1.5.

ESS installations exceeding either: 1) the individual ESS unit rating of 20 kWh, 2) the maximum aggregate ratings for a location, or 3) the aggregate capacities listed above, shall be installed in accordance with 2022 CFC Sections 1207.1 through 1207.9 which apply to non-R-3 occupancies.

For R-3 occupancies, a DBI Permit (or an Electrical Permit) with SFFD review and approval, is required for the installation of ESS unit(s) exceeding 1kWh. The installation of gypsum board, impact protection, and/or rated enclosure can be reviewed and approved on the same permit. The requirement of submitting plans is waived if using *SolarApp+*.

For instant online Electrical Permits for solar PV systems 4kWdc or under, drawings will need to be reviewed by SFFD over the counter at 49 South Ness Ave, 2nd floor at Fire Plan Review.

SFFD Requirements:

1. Construction Plan Documents:

Submitted plans shall contain the following applicable information:

- **Building Information:** provide occupancy type, construction type, number of stories, existing sprinklers and/or fire alarm, etc.
- **Location and layout diagram** of the room or area in which the ESS is to be installed and the room's relation to the entire story/level. Include an elevation view, show all openings (doors, windows), and call out required distance separations including property line and egress paths. Plans and elevations shall be to scale.
- **Details on the hourly fire-resistance rating** of the assemblies upon which the ESS is to be installed (e.g., gypsum board, plywood, exposed studs)
- **Equipment Schedule:** provide quantities and type(s) of ESS to be installed, including but not limited to the following: manufacturer's specifications, ratings and listings of each ESS; battery technology, total capacity (vs. useable energy), quantity (new and existing), make & model number. Include product cut sheets on plans and listing and/or certification documentation on plans [See SAMPLE below]
- **Installation Compliance Certification Statement:** plans shall include the following designer-signed statement indicating installation compliance: *"The ESS installed are in full compliance with the specific ESS listing requirements, UL 9540, and California Building Standards Code."*
- **Design Contractor Information & Signature:** plans shall bear valid California-licensed design professional stamp or contractor license number, name of associated license holder and signature; plans shall be securely bound together, and the first sheet shall have affixed an original signature, and an index of all sheets included; the remaining sheets may have a signature facsimile with the contractor license information.

EQUIPMENT SCHEDULE- SAMPLE				
TAG	QUANTITY	MANUFACTURER	MODEL	DESCRIPTION
A	28	LG	LG365QIC-V5	MODULES, 365 W, MONOCRYSTALLINE/N-TYPE, WHITE BACKSHEET, ANODIZED ALUMINIUM FRAME, Voc= 42.8 V, Isc= 10.80 A
B	28	ENPHASE	IQ7PLUS-72-2-US	MICROINVERTERS, 240 V, MAX CONTINUOUS OUTPUT POWER= 290 W, MAX CONTINUOUS OUTPUT CURRENT= 1.21 A
C	1	ENPHASE	3CX-IQ-AMI-240-3C	PV COMBINER BOX, 125 A, ENPHASE IQ AC COMBINER BOX WITH INTEGRATED 10 A ENVOY BREAKER
D	1	SQUARE D	DU222RB	AC DISCONNECT, 3R, 60A, 2P, 120/240V/AC
E	1	SQUARE D	HOM4280225P C	BACKUP LOADS PANEL, 225A, 200A MAIN BREAKER
F	1	TESLA	BACKUP GATEWAY 2 1232100-XX-Y	BACKUP GATEWAY, 200A, 120/240V, NEMA 3R
G	2	TESLA	POWERWALL 2 2012170-XX-Y	ESS UNIT, 14 KWH TOTAL, 13.5 USEABLE, 240V SINGLE PHASE

2. Installation Requirements:

a) Individual ESS Unit Spacing:

Individual ESS units shall be separated by at least 3-feet of spacing**; modular ESS products shall be considered as an individual unit and shall be limited to the maximum total individual unit capacity of 20 kWh.

****Note:** A reduction of the 3-foot spacing requirement for individual ESS units may be reviewed and approved by the AHJ when complying with Sections 1207.1.5 and 104.8.2. Applicants shall submit copies of both the UL9540A testing report and the installation instructions showing the recommended reduced spacing between the ESS units being installed. If the minimum spacing varies between the two documents, the more restrictive separation distance will be approved.

b) System, Installation Locations:

- ESS System: defined as all ESS units tied into the same PV modules, distribution panel and other such supportive components
- Installation location requirements shall comply with 2022 CFC, Section 1207.11.3
- Any eaves, structures, decking, or other such construction protruding more than 2 feet from exterior wall upon which the ESS is installed shall be located at least 3- feet from the ESS.

3. Clearance to Exposures:

a) All Installations:

- Property Lines:
 - ✓ Exterior ESS shall be installed at a minimum of three (3) feet from property lines, unless protected by a 1-hour fire barrier.
 - ✓ Interior ESS installations that are installed within three (3) feet from the property line shall be installed on not less than one layer of 5/8-inch Type X gypsum board that extends not less than 4- feet in both horizontal directions, installed from the floor to the ceiling, and not less than 4-feet across the ceiling from the wall on which the ESS is mounted.
- Means of Egress: ESS shall be installed at a minimum of three (3) feet from the dedicated 36- inch wide means of egress pathway, unless protected by a 1-hour fire barrier; this pathway is typically defined as the exterior or interior route from the main entrance of a dwelling unit to the public way
- Public Way: ESS shall be installed at a minimum of three (3) feet from the public way, unless protected by a 1-hour fire barrier

b) Interior Installations (e.g., utility closets, attached garage, detached garage, etc.):

- Combustible Storage: clearance of three (3) feet shall be provided in front of electrical equipment for maintenance purposes in compliance with California Electrical and Mechanical Codes and kept clear of all combustible storage.

c) Exterior Installations (outdoors and on exterior walls):

- Property Lines & Means of Egress: minimum separations of three (3) feet may be reduced to 12-inches where a 1-hour free-standing fire barrier (suitable for exterior use) and extending three (3) feet above and three (3) feet beyond the physical boundary of the ESS installation is provided to protect the exposure
- The exterior wall upon which the ESS is installed shall be located at least 12-inches from other exterior walls of the same building in either direction.

4. Construction Requirements:

- Comply with applicable requirements of 2022 CFC, Section 1207.11.3 and 2022 CA Residential Code, Section R302.6 for ESS installations in an attached garage.
- In addition to the sheet rock requirements listed in 3a above (ESS interior installations within three (3) feet of a property/lot line), applicants must ensure installations of ESS comply with the fire separation requirements of Table R302.6 referenced in the California Fire Code and found in the California Residential Code. Table R302.6 requires gypsum board or equivalent to be installed along an entire wall and/or ceiling to provide dwelling-garage separation.

Table R302.6 - Dwelling-garage fire separation.

SEPARATION	MATERIAL
From the residence and attics	Not less than 1/2-inch gypsum board or equivalent applied to the garage side
From habitable rooms <u>above</u> the garage	Not less than 5/8-inch Type X gypsum board or equivalent
Structure(s) supporting floor/ceiling assemblies used for separation required by this section	Not less than 1/2-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

5. Fire Detection Requirements (§1207.11.6 & CA State Fire Marshal Information Bulletin 21-004): there are several ways to meet the intent of this requirement. Below are examples that may apply; this pertains to **R-3 occupancies ONLY**

- a) Existing Fire Sprinkler Monitoring System: verify system has a UL 864/CSFM listed Fire Alarm Control Unit; provide DBI Permit Application (PA) number under which system was installed for reference on plans; a licensed electrical contractor shall apply for a "Fire-Only" permit with the following scope: *"expand existing sprinkler monitoring system to provide heat detection & notification for a new installed ESS"*
- b) Existing Fire Alarm System: verify system has a UL 864/CSFM listed Fire Alarm Control Unit; provide DBI PA number under which system was installed for reference on plans; a licensed electrical contractor shall apply for a "Fire-Only" permit with scope: *"expand existing fire alarm system to provide heat detection & notification for a new installed ESS"*
- c) Existing UL 539/CSFM listed Interconnected Heat Alarms (hard-wired with battery backup) AND Garage/Unconditioned ESS Area Not Exceeding 100 degrees F at All Times: a licensed contractor or design professional shall apply for a DBI permit to install UL 539/CSFM listed interconnected heat alarms above the ESS area(s) (i.e., add additional heat alarms to existing system); may be included on the same permit as the ESS installation; Plans must be stamped by a design professional or indicate

a licensed contractor name and valid CA license number**. **The plans shall include the following statement: "The temperature in the garage/ESS area shall not exceed 100 degrees Fahrenheit at all times"**. Note: A "Fire-Only" permit is not required for UL 539 heat alarms installation.

- d) No Existing System AND Garage/Unconditioned ESS Area Not Exceeding 100 degrees F at All Times: a licensed contractor or design professional** shall apply for a DBI permit to install UL 539/CSFM listed interconnected heat alarms above the ESS area(s) AND heat alarm inside each dwelling unit in an approved location near the door leading to the garage/ESS space; may be included on the same permit as the ESS installation; Plans must be stamped by a design professional or indicate a licensed contractor name and valid CA license number**. **The plans shall include the following statement: "The temperature in the garage/ESS area shall not exceed 100 degrees Fahrenheit at all times"**; A "Fire Only" permit is not required for UL 539 heat alarms installation
- e) No Existing System AND Garage/Unconditioned ESS Area Exceeds 100 degrees F at Any Time: a licensed C-10 contractor shall apply for a Fire-Only Permit to install a dedicated function UL 864/CSFM listed Fire Alarm Control Unit in an approved location at the dwelling unit; UL 521/CSFM listed heat detectors shall be installed at the ESS area(s) and compatible horns/audible appliances at the ESS at inside the dwelling unit, etc.

*** design professional = California State licensed Professional Engineer (PE) or architect; licensed contractors (electrical/C-10) shall obtain a letter from the building owner that includes verification statement and include a copy of letter on plans*

6. **Impact Protection**: Comply with applicable requirements of 2022 CFC, Section 1207.11.7
7. **Equivalencies or Requests for Smaller Separation Distances**: equivalencies may be proposed via a Pre-Application meeting with the SFFD by submitting a Pre-Application meeting request form: <https://sf-fire.org/services/plan-check#pre-ap>;