

5.12 Energy Storage Systems in R-3 Occupancies (2022)

Reference: 2022 California Fire Code Section 1207, 2022 CA Residential Code Section R302.6

Purpose: To provide guidance and clarify requirements to satisfy the 2022 California Fire Code 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, as summarized below:

Section 1207.11.4 – Energy Ratings:

Maximum Capacity per individual ESS Unit shall not exceed 20 kWh

Maximum Aggregate Capacities per Installation Location within a R-3 Occupancy are:

- 40 kWh within utility closets and storage or utility spaces
- 80 kWh outdoors on the ground
- 80 kWh on exterior walls
- 80 kWh in attached or detached garages and detached accessory structure

The maximum energy rating permitted for a R-3 occupancy is 280 kWh, if all four location types were utilized. Example: If the maximum capacity of 280 kWh were installed, it would require the use of at least 14 individual ESS units rated at a maximum of 20 kWh each.

ESS installations exceeding the individual ESS unit rating of 20 kWh or 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.

Per 2022 CFC, Section 105.6.5, a construction permit is required to install energy storage systems (ESS) regulated by Section 1207. For R-3 occupancies, a construction permit is required for ESS at 20kWh or greater.

SFFD Requirements:

1. Construction 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
- Equipment Schedule: provide quantities and types of ESS to be installed, including but not limited to: 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]

EQUIPMENT SCHEDULE- SAMPLE				
TAG	QUANTIT Y	MANUFACT URER	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

- 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 Professional/Licensed Contractor Information & Signature: plans shall bear valid California-licensed design professional stamp or C-10 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;

2. Installation Requirements:

- a) Individual ESS Unit and ESS 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-feet 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. Applicant shall submit copies of both the UL9540A testing report and the installation instructions showing the recommended reduced spacing between the ESS unit(s) 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: a system is 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: ESS shall be installed at a minimum of 3-feet from property lines, unless protected by a 1-hour fire barrier
- Means of Egress: ESS shall be installed at a minimum of 3-feet from the dedicated 36"-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 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 3-feet shall be provided in front of electrical equipment for maintenance purposes in compliance with CA 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 3-feet may be reduced to 12-inches where a 1-hour free-standing fire barrier (suitable for exterior use) and extending 3-feet above and 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

5. **Fire Detection Requirements** (§1207.11.6 & CA State Fire Marshal Information Bulletin 21-004): there are a 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 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"; 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 letter from building owner that includes verification statement and include 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>;