

4.29 Sprinkler protection requirements for parking spaces associated with Electric Vehicles (EV) charging stations (2022)

Reference: 2022 NFPA 13 Section: 4.3.5, A.4.3.5(9) & Sections 19.1.2(1), 19.2.1.2.4(2)(3), 19.2.3.1.1(1); 2022 CFC 903.3.1.1 & 903.3.5

Purpose: To provide additional SFFD guidelines for sprinkler protection of parking spaces associated with EV charging stations not specifically addressed in 2022 NFPA 13. The intent of the higher-risk sprinkler protection for these specific parking spaces, in comparison to common (NON-EV) parking spaces which are required to be protected by an Ordinary Hazard (OH) density over a 1,500 SF area (per 2022 NFPA 13 Section 4.3.3.2 and Table 19.2.3.1.1), is the additional potential higher-risk associated with the EV charging process while the charging station is connected to the EV via a charging port.

The installation of new EV charging stations with EV parking in new and existing structures parking garages is not directly/adequately addressed in the current codes or standards. The EV's large battery (energy storage system—ESS) currently up to 100 kWh for cars with Lithium-Ion batteries in combination with EV charging is a potential high fire hazard condition, due to damage issues of batteries, potential thermal runaway, cascading ignition/fire, and extinguishment of an inaccessible fire due to extreme temperatures and concealed batteries. The EV charging in an enclosed space/structure significantly increases fire-life safety hazards to building occupants, structure, adjacent vehicles, and First Responders.

Per the previous 2016 NFPA 13 Section 5.3.1 and A.5.3.1(1) Automobile parking garages were required to have an OH1 density with 0.15GPM/SF over 1,500SF (per Table 11.2.3.1.1). However, per the current 2022 NFPA 13 Section 4.3.3.2 and A.4.3.3.2(2), Automobile parking garages are classified as OH2 with 0.2 GPM/SF over 1,500SF area (per Table 19.2.3.1.1). It is NOT the intent of this AB to retroactively require a change of EXISTING automobile parking garages OH1 design density (0.15/1500) to become OH2 with 0.2/1500 design density. However, all NEW automobile parking garages not having EV charging stations, shall be designed per 2022 NFPA 13 with OH2 with 0.2/1500 design density.

This AB does not apply for Mechanical-Access enclosed parking garages per 2022 CBC Section 406.6.4 which will require a separate specially engineered automatic sprinkler system on a case-by-case basis.

For the purpose of this AB – A Parking Space associated with an EV charging station is a space within a parking garage that is provided with an EV charging port. (A single charging station may provide EV charging capabilities for more than one parking space utilizing extension charging ports connected to the same charging station)

Specific SFFD requirements:

1.For New Buildings: Where a fire sprinkler system is required by code, the fire sprinkler system shall be designed per NFPA 13-2022 Extra Hazard Group II (EH2) with 0.40

GPM/SF over the parking space(s) associated with EV charging station(s). For area(s) less than 2,500 SF, the EH2 design area(s) are required to extend minimum 3-feet beyond the perimeter of the parking space(s). In this case, the design area(s) are not required to extend 15-feet beyond the perimeter of the parking space(s) as it is currently required by 2022 NFPA 13 Section 19.1.2(1).

2. For Existing Buildings with an existing sprinkler system which is required to protect NEW parking space(s) associated with EV charging station(s), the existing sprinkler system shall be required to be augmented to EH2 with 0.40 GPM/SF design density over the parking space(s) associated with EV charging Station(s) on a separate sprinkler permit. For area(s) less than 2,500 SF, the EH2 design area(s) are required to extend minimum 3-feet beyond the perimeter of the parking space(s). In this case, the design area(s) are not required to extend 15-feet beyond the perimeter of the parking space(s) as it is currently required by 2022 NFPA 13 Section 19.1.2(1).

3. The hydraulic calculation design criteria shall include all sprinklers within a minimum 2,500 square feet area of sprinkler operation, or the maximum area containing parking space(s) associated with EV charging Station(s) extending 3 feet beyond the perimeter of the parking space(s), whichever is less, but not less than 1,500 SF that is required for Ordinary Hazard design density. (OH2 Per 2022 NFPA 13 Section and Table 19.2.3.1.1 with 0.2/1500 density, or OH1 per the previous 2016 NFPA 13 Section 5.3.1 and A.5.3.1(1) and 11.2.3.1.1 with 0.15/1500 density). The EH2 design area can be reduced from 2,500SF to NOT LESS than 2,000 SF if high-temp sprinklers or K-11.2 sprinklers are used at the ceiling per 2022 NFPA 13 Sections 19.2.3.2.6 or 19.2.3.2.7.

4. Where a fire sprinkler system is not required by code for new buildings, or is not provided in existing buildings, the parking space(s) associated with EV charging station(s) shall be separated from all other areas within the garage/building by a minimum of one-hour fire-rated wall separation on three sides. The open side shall have a maximum of 10 feet dimension per each parking space, while maintaining the minimum code required egress/access distances/provisions required by 2022 CBC Chapter 10.

5. Parking space(s) associated with EV charging station(s) having a continuous (single) area that is equal or greater than 1,500 SF shall be required to be provided with hose allowance of 500 GPM per EH2 Per 2022 NFPA 13 Section and Table 19.2.3.1.2.

6. Parking space(s) associated with EV charging station(s) having a continuous (single) area that is less than 1,500 SF shall be required to be provided with hose allowance of 250 GPM per OH2 Per 2022 NFPA 13 Section and Table 19.2.3.1.2.

7. In buildings that are equipped with a fire pump, fire water storage tank, or both, calculations shall be provided to demonstrate that both the fire pump and water storage tank are adequately sized to supply the required pressure, flow, and duration/quantity. See 2022 NFPA 13, Sections 19.1.5 and 19.1.6.

8. In fully sprinkler protected buildings, the fire pump shall be adequately sized to accommodate the required pressure and flow for the hydraulically remote area serving the EV parking spaces. The total required hose stream of either 500-gpm or 250-gpm shall be taken out at the point of connection with the city water main per Section 19.1.6.2 of 2022 NFPA 13. An inside hose stream is not required unless Class II hose stations are connected to the fire sprinkler system.

9. In partially sprinkler protected buildings that have hose valves for fire department use attached to the wet pipe system, the fire pump shall be adequately sized to accommodate the sprinkler demand serving the EV parking spaces added to the 2019 NFPA 14 determined standpipe demand, and not including a separate hose stream demand. See 2022 NFPA 13, Section 19.1.6.4(3).

10. Fire water storage tanks shall be adequately sized to accommodate the fire sprinkler discharge demand for the hydraulically remote area serving the EV parking spaces for a duration of 90-minutes. If the fire water storage tank serves hose valves for fire department use, then an inside hose stream of 100-gpm shall be added to the sprinkler system demand. The fire water storage tank is not required to support any additional outside hose stream unless it is arranged to supply water to outside fire hydrants.

11. If the specific requirements above cannot be met – the SFFD will allow for a performance based design that meets or exceeds the intent outlined in this AB, to be submitted for SFFD review and approval on a case-by-case basis. The applicant may request to have a Pre-Application meeting to discuss specific projects on a case-by case basis.