



Electric Vehicle Fires in Parking Facilities

Electric vehicles (EVs) are becoming the car of choice for many consumers and their presence introduces new hazard and fire risk considerations. While EVs are statistically less likely to ignite than gasoline-powered vehicles, there are additional complications that need to be considered should it occur. This white paper provides some background on that risk, as well as some risk-mitigation recommendations and insurance information as it pertains to EV fires in parking facilities.

Firefighting - Electric Vehicles vs. Combustion Engine Vehicles

Electric vehicle fires have been making the news lately, not because EVs are significantly more likely to catch fire, but because the intensity and duration of the fires makes them much more difficult to extinguish. In a study conducted by the National Fire Protection Association (NFPA), both EVs and gasoline powered vehicles are extinguished by the same extinguishing agent – water. The main

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difference is that EVs take much more water and time to extinguish than a typical internal combustion gas-powered vehicle.

Electric vehicles are powered by lithium-ion batteries. When a lithium-ion battery is damaged from a collision or when external factors such as charger fault, external short-circuit, or defective battery issue which has led to the recall of Chevrolet Bolt electric vehicles, it can lead to a phenomenon called thermal runaway. Thermal runaway is often the result of self-overheating of the battery and can lead to self-fueling battery fires that are very difficult to extinguish.

According to Tesla's Emergency Guide for First Responders, a Tesla Model 3 can require 3,000 gallons of water to extinguish and take up to 24 hours to extinguish completely. Another account measured the amount of water necessary to put out an EV fire at around 30,000 gallons, compared to the 500-1,000 gallons necessary to extinguish a typical internal combustion engine vehicle fire. These types of fires also involve potential re-ignition of the battery, posing additional complications. The amount of water and time necessary to extinguish these fires renders typical dry-chemical fire extinguishers (types A, B, C) largely ineffective in containing these fires.

Fire Protection Considerations for EV Charging in Parking Structures

Sprinklered areas and those near fire department hose connections and standpipes should be prioritized when choosing locations for EV parking and charging stations in garages. Placing hose connections in accessible locations near EV charging areas will help assist the firefighting process and avoid needing to enter the area manually with a hose. Consider adding or increasing the sprinkler capacity and flow rate. If the parking facilities are fire resistive and sprinklered, the fires should typically remain relatively contained. Consult with your fire suppression contractor to determine best options.

What is the risk-sharing with the vehicle owner and how does insurance come into play for EV fires?

Generally, risk-sharing is no different than if a gasoline vehicle starts on fire and causes damages. Any claim will be first directed to the customer's auto insurance policy, so the losses are paid directly by the customer's auto insurance policy. If the customer's auto insurance company does not respond, has insufficient limits or claims they are not at fault, an insured's property policy would respond and cover damages to the parking garage. If the fire causes bodily injury, general liability policies would respond and pay defense, medical, and other costs. Carriers will then pursue subrogation against the customer's auto insurance policies to recoup any paid losses from the fire. These types of claims can



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to minimize risk within
your parking facilities.**

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be fact-dependent, and risk-sharing may vary situationally if the charging stations are owned by or leased from a third-party.

Are there any additional considerations for charging areas?

- EV charging stations should be at least Level 2 and installed by the manufacturer or certified contractors. Level 2 charging stations provide a faster charge and are more durable than Level 1, which are usually the charging cords provided by the vehicle manufacturer for charging at home. Level 2 also features better durability and cord management system that keeps cords off the ground, and have more options for mounting (wall mounted, free-standing pedestal).
- Work with a charger provider who owns the charging stations for installation. Some providers will control or pay for the installation and maintenance of the charging stations.
- Ensure charging stations are regularly inspected per the manufacturer's guidelines for issues such as ground faults or other electrical problems, and any outdated equipment updated or replaced. This will help reduce the likelihood of an auto-ignition.
- Charging stations should have an electrical Fire Department Emergency Disconnect installed within 50 feet.
- Signage that contains indemnification language with use of the charging stations is recommended, with wording such as "Do not charge vehicle while unattended" or that which provides limitations on the amount of time a vehicle can utilize the charging station.
- EV charging stations should not be installed underground. It is recommended to install these outside of garages or first level whenever possible for ease of firefighter access.

As research and development of EV technology improves, the risk of EV fires will likely continue to decrease. Today, with recent recalls of several vehicles due to battery issues, we are not quite there. Ultimately, while the decision can also be made to prohibit EVs from your parking structures altogether, utilizing these safety and facility recommendations can help your organization minimize the risk of including electric vehicles in your parking facilities.

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