

ELECTRIC/HYBRID VEHICLE FIRES

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Category:

Administrative

PURPOSE: As production of electric and hybrid vehicles increase, the department recognizes the need to modify tactics to safely and effectively control emergencies involving Electric/Hybrid powered vehicles. In order to properly respond and protect firefighters while mitigating emergencies when responding to an electric or hybrid vehicle fire. Such incidents create additional and separate challenges responder must consider. The intention is to provide safe parameters and considerations involving this type of emergency.

DEFINITIONS:

Electric Vehicle (EV): An electric vehicle is a vehicle that runs fully or partially on electricity. E-Vehicles use an electric motor powered by a fuel cell or batteries. (60 -330 Volts DC)
Electric vehicles present a potential for electrocution from energy stored in battery packs.

Hybrid Vehicle: A hybrid vehicle is powered by an internal combustion engine that works in concert with an electric motor. An onboard generator produces electricity, and integral software manages its output, directing it to a battery pack.

Thermal Runaway: An uncontrolled increase of cell temperature caused by exothermic reactions inside the cell. A hazardous condition caused by a chain reaction within a battery cell which can be very difficult to stop once started. Causes of thermal runaway – exposure to excessive temperatures, short-circuit, mechanical destruction, penetration, or impact.

PROCEDURE:

Size-Up: Upon arrival, the officer in charge shall size-up the situation informing other responding apparatus of the vehicle type involved and the nature of the problem including vehicle fire and/or extrication. This should include the extent of the fire and if it is a compartment fire or includes the electric components of the vehicle. Special attention shall be made to identify any and all placards and/or labels that may provide essential information to the Incident Commander for the safety of all persons involved.

Water Supply: When suppressing a vehicle fire involving an EV or hybrid, water is the recommended extinguishment agent. If the water carried on the responding apparatus will not be sufficient, early considerations must be given to additional water supply sources. A supply line or additional engines may be required. *Expect to utilize anywhere between 3000 and 8000 gallons of water to effectively cool the battery down.*

1. Establish a safe work zone through department policy and establish tactical priorities (life, property and environment)
2. Wear full PPE with SCBA and face piece, toxic byproducts will be off gassing.
3. Ensure the vehicle is in park and off (if possible) consider chocking the wheels.
4. If no visible fire, Thermal Imaging Camera usage should be considered.

Standard Operating Procedures are meant only to be guidelines. Actual conditions may warrant alternative actions.

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5. DO NOT attempt to pierce the engine or battery compartment of the vehicle to allow water permeation, penetration of HIGH VOLTAGE components could occur.
6. Following extinguishment, use a thermal imaging camera to determine the temperature fluctuation of the high voltage battery before terminating the incident, to reduce re-ignition potential.
7. At least one hose-line shall remain operational until the vehicle is removed from the scene or rendered safe if the vehicle cannot be moved immediately.
8. Place High Voltage (HV) warning tape on all four sides of vehicle.

POST INCIDENT: Brief the towing company operator on the hazards, including;

- To provide a 50' clear space around the vehicle once stored
- Do not store inside a building.

Safety:

- Batteries should always be treated as energized and pose an ongoing risk to first responders and incident investigators.
- During overhaul do not make contact with any high voltage components.
- EV motors run silently, never assume power is shut off. Never assume that an EV will not move.

Manufacturers no longer exclusively identify high-voltage hybrid electric cables and connectors by the color orange. It is now possible to have high-voltage wiring color-coded orange, bright blue or even yellow. Some hybrid vehicles use two different colors for their high-voltage electrical system on the same vehicle!