

SOG# 501-15	Standard Operating Guideline		
	Cumberland Road Fire Department Inc.	Approved By	
		Steven Parrish, Fire Chief	
		Effective Date	Revised Date
	Response to Vehicle Fires	8-17-2023	12-1-2025

PURPOSE

The purpose of this guideline is to establish safe, consistent, and modern operational procedures for members of the Cumberland Road Fire Department responding to vehicle fires. As vehicle technology has advanced, the hazards associated with suppression operations have significantly increased. This policy ensures that personnel operate safely while performing life safety, incident stabilization, and property conservation functions. It incorporates both traditional vehicle fire hazards and contemporary considerations involving electric vehicles (EVs), hybrid vehicles (HVs), compressed natural gas (CNG), liquefied petroleum gas (LPG), and advanced construction materials.

SCOPE

This guideline applies to all CRFD members responding to fires involving motor vehicles located on public roadways, private property, residential driveways, commercial occupancies, and parking structures. It governs suppression, rescue, overhaul, and investigative activities conducted by the department.

GENERAL PROCEDURES

Upon arrival, the first-due officer shall conduct a comprehensive size-up evaluating smoke and fire conditions, vehicle type, hazards, occupants, and exposures. The officer shall announce conditions and establish command. If nothing is showing, crews shall assume an investigative posture and reduce or cancel incoming units as appropriate. When fire is present, crews shall initiate coordinated suppression after addressing tactical priorities and safety considerations. All members must remain aware of evolving hazards associated with modern vehicle systems.

APPARATUS PLACEMENT

Apparatus placement is critical for firefighter safety. Engines should be positioned uphill and upwind whenever possible to avoid smoke, vapors, and fuel runoff. Apparatus shall be used to provide a protective barrier between firefighters and oncoming traffic. Warning lights shall remain active, and cones shall be deployed when roadway conditions require additional traffic control. Flares shall be used sparingly and only when fuel spills are not suspected.

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PPE REQUIREMENTS

All personnel operating within the hazard zone must wear full structural firefighting protective clothing and operate on SCBA air throughout suppression, overhaul, and investigative operations. The combustion of plastics, composites, and modern interior materials produces highly toxic smoke and gases. Company officers supervising close-in operations shall also be in full PPE.

FIRE ATTACK OPERATIONS


Fire attack operations must be carried out deliberately, with strong emphasis on firefighter safety. A minimum 1¾-inch handline shall be deployed to provide adequate flow and reach for the majority of vehicle fire scenarios. Firefighters shall approach the vehicle from a 45-degree angle to reduce exposure to exploding bumpers, wheels, struts, and similar hazards. Direct approaches from the front or rear are prohibited. Initial water application should protect the passenger compartment and achieve a quick knockdown. Vent-limited interior conditions may cause rapid flame development when doors or windows are opened. Crews must anticipate this behavior. In incidents involving trapped occupants, defensive cooling shall be applied immediately to protect victims and firefighters until a safe rescue can be completed. After initial knockdown, concealed fires in engine compartments, dashboards, rocker panels, and trunks must be carefully exposed using hand tools. SCBA use is mandatory throughout due to hazardous off-gassing and the presence of energized systems.

CRITICAL HAZARDS

Vehicle fires contain numerous critical hazards that must be recognized and mitigated. Airbags and supplemental restraint systems may deploy unexpectedly when heated, including steering wheel, dashboard, seat, and curtain airbags. Seatbelt pretensioners may also activate under heat. Shock-absorbing bumpers contain pressurized cylinders that can violently eject components forward or rearward. Gas struts used in hoods, trunks, and hatchbacks may explode and should be treated with caution. Tires and wheels, including split-rim assemblies, can rupture forcefully during fires. Fuel tanks may melt, rupture, or suddenly release flammable liquids, significantly intensifying the fire. Gas caps shall not be removed, nor shall hose streams be directed into tank openings as this may cause dangerous pressurization. Cargo areas may contain unknown hazardous materials requiring extreme caution. Due to toxic combustion products, SCBA must remain in use through all phases of the incident.

ELECTRIC AND HYBRID VEHICLES

Electric and hybrid vehicles introduce high-voltage battery hazards requiring heightened awareness. Crews should identify EV/HV involvement through visible markings, floorboard or under-carriage fire location, off-gassing, or smoke behavior. These vehicles shall be treated as energized systems at all times. If life hazards or exposures do not require immediate extinguishment, it may be tactically

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advantageous to allow the vehicle to burn under controlled conditions. When suppression is necessary, significant volumes of water may be required—potentially exceeding 3,000 gallons—to cool battery systems. Crews shall not cut into or puncture battery casing. Battery temperatures must be monitored with a thermal imaging camera for a minimum of one hour to confirm stabilization. Re-ignition is common in damaged lithium-ion systems. After extinguishment, EVs must be isolated and kept away from structures and other vehicles due to delayed thermal runaway potential.

CNG AND LPG VEHICLES

Vehicles powered by compressed natural gas or liquefied petroleum gas present BLEVE hazards. Relief valves may produce a blowtorch effect when activated. If flames are impinging on visible CNG/LPG tanks, crews shall cool the tank from a safe distance. If relief valves are ignited, the product should be allowed to burn while maintaining cooling operations. Shutoff valves may be secured only when access is safe.

SPECIAL INCIDENT LOCATIONS

Parking garage vehicle fires require additional considerations due to limited access, smoke accumulation, and potential structural impacts. Additional resources shall be requested as needed. If a sprinkler system is present, supporting the system by supplying the FDC may significantly reduce fire spread. Vehicle fires involving EV charging stations shall be treated as energized electrical equipment until power is confirmed secured.

OVERHAUL AND INVESTIGATION

After suppression is complete, crews shall conduct a thorough overhaul while maintaining full PPE and SCBA. EV/HV vehicles require extended monitoring for re-ignition. For fire cause determination, the Cumberland County Sheriff's Office or the authority having jurisdiction shall be contacted. If the incident occurs on a state-maintained road or right-of-way, the North Carolina Highway Patrol shall also be notified. These requirements remain unchanged from the original CRFD policy and are mandatory.

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DOCUMENTATION AND POST-INCIDENT ACTIONS

Incident reports shall document the vehicle type, hazards encountered, suppression methods, water usage, EV/HV temperature trends, and all investigative actions taken. Tow operators shall be advised to store EVs at least 50 feet from exposures and never inside enclosed structures due to re-ignition risk.