When Global EV Fire Guidance Is Built on Tests That Maximize Failure

Two test programs departed from an established dry protocol with no reported deflagration in 15 years of correct use

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For approximately 15 years, vehicle fire blankets have been used in more than 50 countries without a single reported deflagration when the established dry procedure has been followed. No water is used before or beneath the blanket. The cover is not lifted. Its temperature is monitored from outside, and it remains undisturbed until it has cooled to approximately ambient temperature.

That procedure was never tested in the experiments now shaping global electric vehicle fire guidance. Instead, both programs applied water before deployment, and the 2026 program repeatedly introduced oxygen beneath the blanket, including when ignition was judged probable.

The title refers to the test conditions, not to researcher intent. Water before deployment increased steam volume and increased hydrogen production in the hot and damaged cells. Repeated lifting then introduced oxygen into an atmosphere holding heat and accumulated combustible gases. Together, these two departures created conditions that maximized the likelihood of deflagration.

Whether deflagration beneath a blanket is theoretically possible is not the question here. The question is narrower and more consequential: did the experiments that produced the reported deflagrations represent the established operational deployment method?

They did not. And guidance is being written as though they did.

Two procedures

Correct operational deployment	Test protocol
No water before deployment	Water applied before deployment
No water beneath the blanket	Continuous water beneath the blanket (BS experiments)
No lifting	Repeated lifting
External temperature monitoring only	Repeated inspection beneath the blanket
Removal only after cooling to approximately ambient	Blanket manipulated while thermal runaway could still be active
Approximately 15 years with no reported deflagration	**Lifting performed deliberately to investigate ignition hazards, in some cases when ignition was judged probable**

Correct operational deployment

1. Pull the blanket over the vehicle.
2. Apply no water, before or beneath.
3. Do not lift or inspect.
4. Monitor the blanket temperature from outside.
5. Remove only after it has cooled to approximately ambient.

The test protocol

6. Water applied to the vehicle before the blanket was deployed.
7. In two experiments, water applied continuously beneath the blanket afterward.
8. The blanket lifted repeatedly to introduce ambient air.
9. Lifting performed in some cases when ignition was judged probable.
10. No experiment left the blanket undisturbed until the incident was complete.

The last of these is the report's own statement.[5, p. 59] So is the guidance. The report advises that once a fire blanket has been deployed, firefighters should maintain a safe distance and not manipulate it in any way, since doing so can introduce oxygen and lead to reignition or deflagration, and that this includes lifting and repositioning.[5, p. 89, §5.2.2.1] The experiments did the opposite, deliberately and for research reasons. The guidance and the protocol do not describe the same operation.

What is at stake

Removing the tool from guidance on the strength of that result is not caution. It preserves a response built on large water volumes, and with it prolonged firefighter proximity, exposure to smoke and contaminated equipment, runoff entering soil and drains, longer smoke production, and a greater likelihood that the battery event is interrupted before the available energy is consumed, leaving stranded energy and delayed reignition during recovery, transport and storage. Correct dry containment stops combustion of most of the vehicle's plastics, tires, seats and trim within seconds, which is most of the smoke and combustion gases outside the battery itself.

What the test programs compared

Water was applied before deployment in both programs. In the earlier 2025 UL test program, water was applied for approximately 20 to 30 seconds before blanket deployment in the experiment later described as dry. At the documented handline flow rate of approximately 568 liters per minute / 150 gallons per minute, that is approximately 190 to 284 liters / 50 to 75 gallons.

For the 2026 FSRI and UL Research Institutes program the sources must be kept apart. The report states that in the combined blanket and nozzle experiments the cabin fire was suppressed with a handline for fewer than 10 seconds before deployment[5, p. 56] — up to approximately 95 liters / 25 gallons. For the two blanket only experiments it records the suppression water volume as none.[5, p. 54, Table 4.3] It has been confirmed independently that water was applied before deployment in those experiments. The duration is not documented in the report.

Following the 2025 program, Bridgehill repeatedly informed NFPA and other parties that the established procedure requires no water before or beneath the blanket, and shared an extended technical report on the subject. That information was available before the 2026 experiments. The departure was not caused by an absence of guidance or prior knowledge.

The blanket was then lifted deliberately. The report states that lifting was incorporated to investigate hazards associated with manipulating the blanket, that this diverges from some fire blanket manufacturer recommendations, and that in some cases it was lifted when ignition of the smoke was judged probable.[5, p. 40] No significant change in fire behavior occurred until a corner was lifted; in E-FM-B the second lift was followed by a significant deflagration and sustained flaming, which the report attributes to oxygen mixing with trapped gases and bringing the mixture into the flammable range.[5, p. 55] Two further deflagrations occurred in E-TM-BS, 9 and 17 minutes after the last lift, described as unprovoked.[5, p. 59] Both were in a water experiment involving approximately 4,095 liters / 1,078 gallons, after the blanket had already been manipulated. The argument is not that lifting alone caused every deflagration. It is that no experiment tested correct dry deployment.

Thermal runaway was already producing heat and combustible gases. Water generated large volumes of steam and increased hydrogen production. These gases accumulated beneath the blanket. Repeated lifting then introduced oxygen into that atmosphere. None of the experiments tested correct operational use of a vehicle fire blanket. It is difficult to create conditions more favorable to deflagration than those created in these experiments.

Why water changes the scale

Gas production does not stop beneath a blanket. Thermal runaway releases hydrogen, carbon monoxide and light hydrocarbons under any cover, and the report calculates that vent gas alone can exceed the flammable limit after only a fraction of the traction battery has reacted.[5, p. 63, Fig. 4.10] That finding argues for caution around any deployed cover. It does not demonstrate failure of correct dry containment: combustible gas is one part of the mechanism, oxygen must still be present in sufficient concentration, and under correct deployment the blanket is not disturbed.

What water adds is volume. One liter / 0.26 gallons of liquid water produces roughly 1,700 liters / 60 cubic feet of steam, against an estimated 5 cubic meters / 177 cubic feet of free gas volume beneath a blanket over a Tesla Model Y. As an illustration of scale, twenty percent conversion of the 190 to 284 liters applied in the 2025 program would produce approximately 65 to 97 cubic meters / 2,281 to 3,410 cubic feet of steam — thirteen to nineteen times the free volume. Neither the steam volume nor the evaporation rate was measured, and steam is only one component of the total gas burden.

Water also adds hydrogen. A charged lithium ion cell holds lithium in the graphite anode; under extreme heating that structure breaks down and highly reactive lithium is released,[1] and water and steam reaching it produce hydrogen.[2] A fully charged 3 Ah cell contains approximately 0.78 grams of lithium equivalent, so a 6,000 cell pack represents roughly 4.7 kilograms / 10.4 pounds and a stoichiometric upper bound of approximately 7,500 liters / 265 cubic feet of hydrogen. If 30 percent of that became available and reacted, the theoretical additional volume would be approximately 2,250 liters / 79 cubic feet — on top of the hydrogen thermal runaway was already producing.

Lifting was never necessary to measure any of this. Gas leaves the covered volume through the folds and corner openings along the lower edge, and hydrogen and other species can be sampled there while the cover stays in place. This is a test method proposed by the author, not one drawn from the published work.

Health, environment and recovery

Full scale Swedish testing found firewater from both conventional and electric vehicle fires highly toxic to aquatic organisms, with higher concentrations of lithium, nickel, cobalt, manganese and fluoride from the electric vehicle, and substantially increased PFAS when the battery was flushed.[3] Water does not remove contamination. It redistributes it into runoff, soil, drains and water systems, and onto surfaces and protective equipment.

Occupational exposure as a firefighter is classified by the International Agency for Research on Cancer as carcinogenic to humans, Group 1.[4] Prolonged water application keeps crews near smoke, steam and contaminated equipment; a blanket can be pulled over the vehicle within seconds and crews can withdraw. Hydrogen fluoride released during lithium ion battery fires also reacts readily with moisture to form hydrofluoric acid, adding a risk of severe chemical burns, inhalation injury and contamination of protective clothing wherever water and condensation are present.[7]

After the fire the approaches diverge again. Sustained cooling can suppress visible activity while stored energy remains, and the vehicle is then extracted, transported and stored with that energy still in it. Dry containment lets the pack burn out instead. It does not guarantee every cell is fully discharged, so the vehicle should still be handled with care and moved while covered where practical.

The operational record

Test results are not the only evidence available. Across approximately 15 years of reported operational use in more than 50 countries, vehicle fire blankets have been deployed on hundreds of electric vehicles, and no deflagration has been reported when the blanket was deployed dry, left undisturbed and removed only after cooling to approximately ambient temperature. Deflagrations have been reported where large quantities of water were introduced.

What changed is practice, not the equipment. Cooling is widely taught and water is what crews reach for, but cooling and containment rest on different principles, and combining them creates a different operation with different risks. A test can only evaluate the procedure actually used. This will matter more as battery chemistry changes: lithium metal designs are in development for future electric vehicles because they offer substantially greater energy density.[6] Guidance should distinguish between chemistries rather than normalize water as a universal response.

What is being asked for

11. Run a controlled dry series against the five step procedure above — no water at any stage, no lifting, removal only after cooling to approximately ambient.
12. Measure and publish gas species, including hydrogen, at the natural venting points formed by the folds and corner openings, without lifting or disturbing the cover.
13. Write guidance that names the tactic being restricted, not the tool.

The advisory was right that gas accumulates under a blanket. But the experiments tested water applied before deployment, in vehicles where the cover was repeatedly manipulated and oxygen deliberately introduced while thermal runaway could still be active. That is not dry containment, and it cannot be used as evidence against it. Guidance written now will shape training for a decade. The distinction between correct dry containment and a wet vehicle under a cover is the difference between understanding the method and letting the wrong explanation set the procedure.

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