

EV FIRE SAFETY — COMMERCIAL CAR PARKS

PROTECTING YOUR CUSTOMERS, STAFF & YOUR CAR PARK

A practical guide to EV fire risk and layered suppression strategy for shopping centres, office developments, and paid parking facilities.

THIRD PARTY TESTED

APPLUS+ CERTIFIED

SCI VALIDATED

A technical guide for facilities managers, fire risk assessors and building owners responsible for commercial car parks



WHY EV FIRES ARE HARDER TO CONTROL

~4,000L

Water typically needed to extinguish a petrol or diesel car fire

Up to 40x

More water an EV battery fire can require to bring under control

EV fires also burn hotter (up to 1200°C at the cell), resist conventional suppression, and can re-ignite hours or days after apparent extinguishment — the reason a layered, engineered response is required.

Source: Allied World Insurance; CTIF; EV FireSafe — see Slide 3

THE RISK

Why EV Fires Hit Harder in a Commercial Car Park

The industry consensus: the likelihood of a thermal runaway event remains relatively low. But the potential consequences are significantly greater than a conventional vehicle fire — because of the heat generated, the duration of the event, and the risk of fire spread within the structure.

Lithium-ion thermal runaway is not a fuel fire

It is a self-sustaining chemical-thermal reaction inside the cell, not a fire fed by external fuel — and it cannot be extinguished by cutting off oxygen. Once a battery pack enters thermal runaway, cell-level temperatures can reach 900°C+, propagating cell-to-cell regardless of external conditions unless it is met with sustained, targeted cooling.

In a shopping centre, office car park or paid parking facility, that event occurs beside customer and staff vehicles — often during peak trading hours or a full working day. The building above and around it depends on continuous access and footfall, not just parked cars.



Operational Continuity

Shopping centres, offices and paid car parks depend on continuous access. A thermal event affecting parking or charging infrastructure can force partial or full closure — a direct hit to trading and footfall, not simply a vehicle loss.



Means of Escape

Charging bays sited close to entrances, stairwells or plant rooms can compromise evacuation routes for staff, shoppers and visitors if a thermal event develops nearby.



A Growing Risk, Not a Static One

EV ownership continues to rise and charging infrastructure across commercial car parks is expanding fast. Exposure that looks manageable today compounds as EV numbers on site grow.

UNDERSTANDING THE HAZARD

Why EV Battery Fires Cannot Be Managed Like Conventional Vehicle Fires



Self-Sustaining Reaction

Thermal runaway is an internal chemical process, not an external fuel fire. It cannot be smothered or starved of oxygen. The only effective intervention is rapid cooling at the cell level combined with encapsulation of off-gases.



Extreme Heat Release

EV fires produce significantly higher heat release rates than conventional ICE vehicles. A fully developed battery fire can cause structural damage to the car park deck within minutes.



Toxic Off-Gassing & VCE

Thermal runaway releases flammable and toxic gases, including hydrogen fluoride. In an enclosed structure these accumulate rapidly, creating a toxicity hazard and the potential for a Vapour Cloud Explosion (VCE) — where accumulated flammable gas ignites explosively.



Re-Ignition Hours Later

Even after apparent extinguishment, cells can retain enough energy to re-ignite hours later. Effective suppression requires long-term thermal stabilisation, not just an initial knock-down.

Success is measured by heat reduction and re-ignition prevention — not just whether flames are visible.

THE EQUIPRO SOLUTION

A Layered, Certified Fire Protection Strategy for Commercial Car Parks & Charging Bays

Effective car park protection is not one device. It is a layered strategy — each layer independently certified, engineered to work together.

01

AUTOMATIC — PER BAY

EV Car Safe

**3rd Party Certified
Water Only**

Fixed unit installed beneath each EV charging point or parking bay. Thermal detection triggers automatic water discharge directly onto the battery underside — immediate containment at source. Certified with water, no additive required.

02

AUTOMATIC — BUILDING-WIDE

EQUINOX Sprinkler

**Applus+ Certified
Water + 3% Cold Fire**

Ceiling-mounted system, Applus+ certified with water + 3% Cold Fire — the certified agent for this system. Controls structure-wide spread, limits heat to the building fabric, prevents vehicle-to-vehicle propagation.

03

MANUAL — FIRST RESPONSE

EQUINOX Hose Reel

**Applus+ & SCI Certified
Water + Cold Fire**

25mm semi-rigid hose reel, pre-dosed with Cold Fire. Applus+ certified (lithium-ion pallet truck fire, 2 min 12 sec extinguishment) and SCI live fire tested: full extinguishment in 5 minutes following automatic suppression. Prevents re-ignition during manual intervention.

04

MANUAL — PORTABLE

EQUINOX Extinguishers

**NTA 8133 Aligned
Powered by Cold Fire**

Portable and wheeled Cold Fire extinguishers, including 45L trolley units, for early-stage intervention on individual cells before full thermal runaway develops. First-response tool for facilities and security staff.

LAYER 01 — PER-BAY PROTECTION

EV Car Safe

THIRD PARTY CERTIFIED

WATER ONLY — NO ADDITIVE

Compact fixed unit installed beneath each EV parking bay or charging point. Automatic thermal detection and water discharge — no staff action, no delay.



Linear heat detection — 68°C activation threshold, triggers in ~10 seconds



Upward laminar water discharge targeting the battery pack underside directly



Automatic solenoid valve — activates without any staff involvement



BMS and fire alarm compatible — integrates with building control systems



Tridimensional diffuser nozzles protect the vehicle and adjacent bays



Firefighter standoff connection — safe remote activation from a distance

15 kg · Max 100 lpm at 5 bar · Connects to existing water supply · No major construction



INSTALLATION VIEW — per-bay unit beneath EV parking bay

EV CAR SAFE — INDEPENDENT LIVE FIRE VALIDATION

SCI Servicios de Control e Inspección | Enclosed Car Park Simulation, February 2026

Tested with water only — no additive. Confirming certified performance in a car-park-representative enclosed environment.

TEST CONDITIONS

- Vehicle: Renault Zoe — real operational EV, 40 kWh NMC battery
- 98% State of Charge — worst-case energy level for testing
- Accelerant applied to underside — fire growth beyond battery-only
- Suppression delayed 10 minutes after confirmed thermal runaway
- Enclosed container representing a covered car park deck

RESULTS — PASSED

~10 secDetection to
activation**24 min**Fire controlled
water only**<200°C**Ceiling temp —
structure intact**72 hrs**Zero re-ignition
monitored

LAYERED STRATEGY IN A SINGLE LIVE FIRE

The same test also validated the EQUINOX Hose Reel (with Cold Fire additive) — full extinguishment in 5 minutes after EV Car Safe containment. Both layers passed in the same enclosed car park scenario.

Source: SCI Report 260050IRGBAR-OT01-IF01 rev.0, February 2026 — draft issued in lieu of final published report.

LAYER 02 — BUILDING-WIDE PROTECTION

EQUINOX Sprinkler System — Applus+ Certified with Water + 3% Cold Fire

The EQUINOX Sprinkler System is Applus+ certified specifically with water + 3% Cold Fire additive for EV fires in car parks and garages. This is the certified agent and configuration — not an option.

60 kWh

NMC Battery Pack
>85% State of Charge

**<2.5
kW/m²**

Max Radiant Heat
at 2m — safe for staff

<200°C

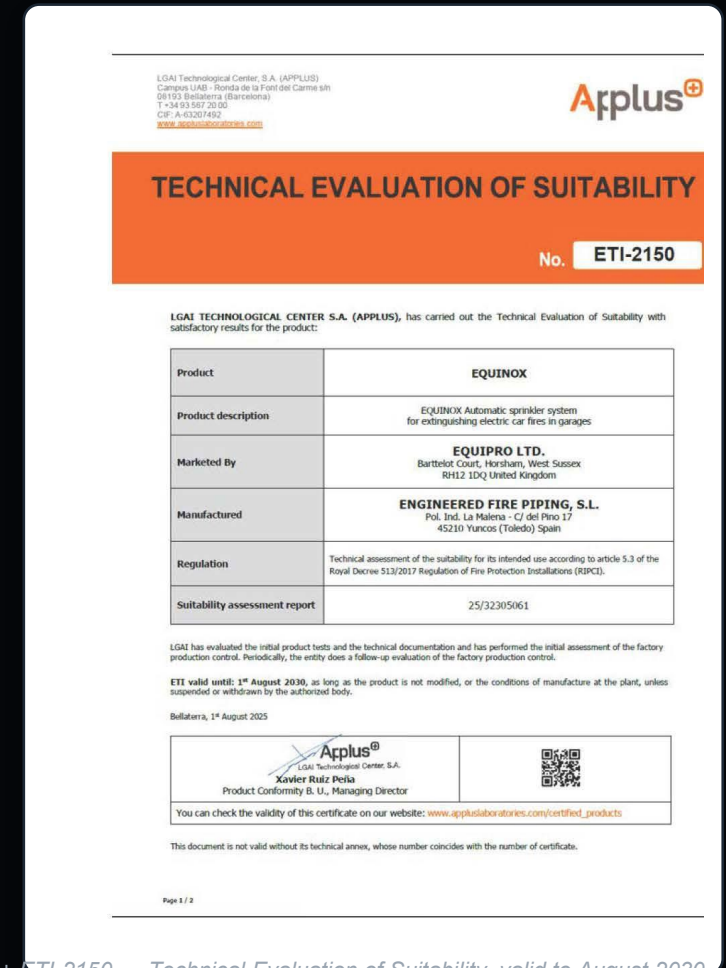
Slab / Ceiling Temp
Structure preserved

ZERO

Fire Spread to
Adjacent Vehicles

Car park significance: adjacent vehicle at 75 cm — glass, tyres, mirrors, lights and interior trim all unaffected throughout the full test duration. **Why Cold Fire for the sprinkler?** It encapsulates heat 21× faster than water — enabling a standard-scale sprinkler system to control events plain water alone cannot fully stabilise.

System flow: 470 l/min at 2.1 bar | 4 TYCO TY323 sprinklers activated | Test duration: ~48 minutes | Zero re-ignition



LAYER 03 — MANUAL FIRST RESPONSE

EQUINOX Hose Reel — Rapid Extinguishment and Re-Ignition Prevention

APPLUS+ & SCI CERTIFIED

WATER + COLD FIRE

In the same live fire test that validated EV Car Safe, the EQUINOX Hose Reel was deployed following 24 minutes of automatic floor suppression — achieving complete extinguishment.

5 min

Full extinguishment

14.25L

Cold Fire used

95 lpm

Average flow rate

72 hrs

Zero re-ignition

In a commercial car park, the hose reel gives facilities and security-trained staff a decisive first-response tool, with Cold Fire encapsulation preventing re-ignition during manual intervention.

Validated twice: Applus+ Report 25/32302576 separately confirms extinguishment in 2 min 12 sec, zero re-ignition, on a lithium-ion pallet truck fire.



THE MISSING LAYER

Evacuation & First Responder Support — LFIM Mask System

CE & NIOSH CERTIFIED

UP TO 15 MIN PROTECTION

Earlier we flagged means of escape as a risk where charging bays sit close to entrances or stairwells. LFIM is the system that directly answers it — enabling trained facilities and security personnel to assess, intervene and support evacuation in the critical minutes before suppression systems fully stabilise an incident, and before the fire service arrives on scene.

- Full-face respiratory protection against HF, HCl, CO, LiOH, soot and particulates released in lithium-ion thermal runaway
- Up to 15 minutes of operational protection window — enough to assess, evacuate, and support a controlled first response
- EN136 (full-face), EN14387 (gas/particle filtration), EN166 (impact) and NIOSH / ANSI Z87.1 approved

Not a replacement for firefighting

For initial assessment, evacuation support and controlled intervention — not extended firefighting, not a substitute for SCBA or confined-space entry.

Trained, not just supplied: Equipro delivers LFIM training alongside every deployment — hazard awareness, response procedures, safe respirator use and evacuation protocols.



LFIM Mask & Intervention Kit — as supplied by Equipro

15 min

Operational protection window

5 yrs

Shelf life, maintenance-free

Relevant across the site: car park control rooms, plant rooms, loading bays and any location where staff may need to intervene before the fire service arrives.

BEYOND YOUR CAR PARKS

Wider Equipro Capability Across Your Building

Two further areas of Equipro competency directly relevant to commercial buildings — summarised here as background, available in full technical detail on request.



Tested & Certified Sprinkler Systems

Car parks have historically been classified Ordinary Hazard Group 2 (OH2). Regulatory trends are pushing toward OH3 — demanding oversized infrastructure and much larger water storage.

EQUINOX sprinkler infrastructure, powered by Cold Fire, offers a technical alternative: performance-based suppression at the source rather than infrastructure overhead. Cold Fire encapsulates heat up to 21× faster than water, controlling events plain water alone cannot fully stabilise.

Every EQUINOX system is third-party tested and certified by Applus+ — applicable building-wide: retail units, stores, offices, plant rooms.

Applus+ Certified · OH2/OH3 alternative · Building-wide application



E-Bike & E-Scooter Fire Suppression

Lithium-ion e-bikes and e-scooters are one of the UK's fastest-growing fire risks — a relevant exposure wherever a building stores or charges these devices, including cycle stores, delivery fleets and staff or customer e-bike parking.

EQUINOX-HP is a high-pressure water mist and Cold Fire system engineered for enclosed e-bike/e-scooter shelters and stores. After the main discharge stops, it vents nitrogen for ~90 minutes to flush flammable off-gases and prevent vapour cloud explosion — a hazard invisible to conventional suppression.

Independently tested and certified by Applus+: zero fire spread between cells, structure intact, zero re-ignition.

Applus+ 25/32303542 · PFAS-free · Vapour cloud explosion prevention

THE ASSESSMENT

A Bespoke EV Fire Risk Assessment for Your Car Park

Not a generic template. A dedicated, site-walked technical addendum that sits alongside — and directly references — your existing Fire Risk Assessment, rather than duplicating it.

SCOPE OF ASSESSMENT

-  **EV charging locations & parking arrangements**
A bay-by-bay review of current and planned charging infrastructure across the site.
-  **Impact on means of escape**
How charging bay positioning affects evacuation routes for staff, shoppers and visitors.
-  **Fire spread — vehicle to vehicle, vehicle to structure**
Modelling propagation risk between vehicles and into the building fabric.
-  **Existing fire safety measures & response arrangements**
A structured audit of what's already in place, and where the gaps sit.
-  **EV demand growth over time**
The increasing number of EVs expected in the car park, and how exposure changes as it grows.

THE DELIVERABLE

A risk-based report with clear, costed recommendations — giving you what you need to decide whether further controls are justified. Where they are, we set out the options: localised suppression for charging bays, enhanced detection, specialist hose reel systems, fire curtains and compartmentation, and other engineering controls sized to the actual risk on site, not a generic checklist.

Delivered by an accredited Equipro fire safety consultant

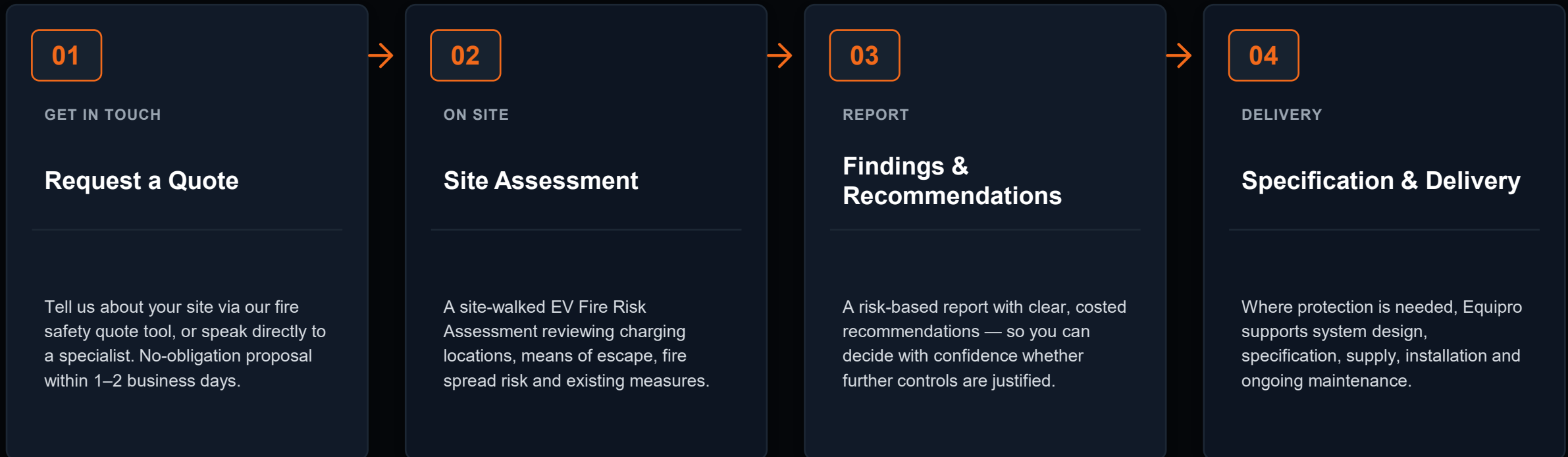
Part of Equipro's wider fire safety consultancy service — full scope and instant quoting at equiprofire.com/fire-consultancy/fire-safety-quote

Proposal & quotation ready to issue on confirmation

HOW WE WORK WITH YOU

A Straightforward Process, From Enquiry to Installation

No two car parks are the same — but the process for getting to a validated protection strategy is consistent.



Request a no-obligation quote at equiprofire.com/fire-consultancy/fire-safety-quote — 222 services across 22 categories, response within 1–2 business days.

WHY EQUIPRO

The Case for Certified, Layered EV Fire Protection in Your Car Park

WHAT THE STRATEGY DELIVERS

- Bay-level automatic containment before an event can spread to adjacent vehicles or structure
- Zero fire spread to adjacent vehicles at 75 cm — confirmed in Applus+ full-scale testing
- Safe conditions for staff and visitor evacuation — temperatures below 60°C at 2m throughout suppression
- Ceiling and slab temperatures held under 200°C — building fabric protected
- Zero re-ignition in 72-hour monitoring across both independent test programmes
- Proactive compliance as insurer and regulatory requirements around EV charging continue to tighten

Applus+ ETI-2150

Technical Evaluation of Suitability — EQUINOX sprinkler (water + 3% Cold Fire) for EV fires in car parks and garages. Valid to August 2030.

Applus+ 25/32303489

Full-scale 60 kWh EV thermal runaway test. Zero fire spread, zero re-ignition, structure preserved. Signed: Quim Vilar, Fire Safety Engineer, June 2025.

SCI Live Fire 2026

EV Car Safe (water only) and EQUINOX Hose Reel (Cold Fire) validated in a single live fire. Both systems passed. Zero re-ignition in 72 hours.

About Equipro Ltd

OEM partner for Cold Fire, manufactured by Firefreeze Worldwide Inc. We develop, certify and supply EQUINOX fire suppression systems for lithium-ion and EV applications worldwide — including motorsport (NASCAR, IndyCar, IMSA; FIA TL52 & TL16, SFI 17.1 certified).

Applus+ ETI-2150 & 25/32303489 | SCI 260050IRGBAR-OT01-IF01 | FIA TL52 & TL16 | SFI 17.1 | UL/FM/IMO
| NFPA 18/18A | NTA 8133:2021

PROTECTING YOUR CUSTOMERS. YOUR STAFF. YOUR CAR PARK.



Ready to Assess Your Car Park?

1

Request a no-obligation quote for an EV Fire Risk Assessment

2

We carry out a site-walked assessment of your car park

3

Receive a risk-based report with clear, costed recommendations

4

Equipro supports specification, supply and installation if further controls are needed

EV Car Safe — 3rd party certified, water only · EQUINOX Sprinkler — Applus+ certified, water + 3% Cold Fire

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Who this guide is for

Facilities Managers & Fire Risk Assessors

Shopping centres, office developments, paid parking and other commercial car parks