



Green Protection for New Energies



Fire Protection for Parking Garages and Charging Infrastructure



Electric vehicles

During the charging process of electric vehicles, the battery is electrochemically active. Faults in the electronics or the cells can cause the battery to ignite with rapid energy release. Other components of the vehicle often become secondary fire loads.

Vehicles with combustion engines

Fires are caused by faulty electrics or heat related issues. Primary fire loads are usually components of the chassis and the interior. Fuels and lubricants are rarely the source of a fire. These kind of fires often develop slowly.

FOGTEC: Safe and Eco-Friendly

FOGTEC is specialised in environmentally friendly protection against fire risks. Water mist technology, which uses pure water and highly available sensor systems for the earliest fire detection are the basis for sustainable fire protection. FOGTEC offers consulting, design and supply. The multidisciplinary team with employees from 20 nations works on all continents and includes engineers of more than 12 different disciplines.

100% environmentally friendly solutions offer special protection for new energy sources and modern mobility on both roads and rail. Research and development represent an essential part of the activities. FOGTEC has one of the largest data collections of full-scale fire tests in the world. Numerous developments are patented.

Know-how is continuously being expanded in research projects in cooperation with universities and scientific institutes. This knowledge is made available to the public through intensive collaboration on guidelines by CEN, DIN, VdS, APSAD, FIA FM, PIARC, SOLIT and ITA Cosuf.



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Research Project for New Energy Carriers

SUVEREN – Safety of Urban Underground Structures due to the Use of New Energy Carriers

Part of the SUVEREN research project included the most comprehensive investigation of firefighting and detection of fires involving lithium-ion batteries, to date. In a research consortium with the Federal Institute for Materials Research and Testing (BAM) and the Society for the Study of Tunnels and Transportation Systems (STUVA), a number of other aspects of these fire risks were investigated.

Numerous fire tests at cell- and battery-pack level have led to fundamental new findings. These findings are the direct basis for FOGTEC's fire protection solutions for car parks and underground garages.



Test setup for the simulation of an underground garage fire



Traction batteries used in the tests

Fire Protection Solutions for Car Parks With Electric Vehicles

Car Parks with Charging Stations

In urban environments, parking space with modern charging infrastructure are becoming increasingly important. This results in new challenges for fire protection. Battery-powered vehicles do not represent a greater fire load. However, fire behaviour, fire progression and emissions are changing. New protection concepts must take this into account.

Hazards in areas with charging stations

During charging, a fire can occur due to defects in the electrics, control system or software as well as production-related failures in individual battery cells. The high energy density promotes a rapid development of fire with the release of large quantities of toxic and corrosive gases.

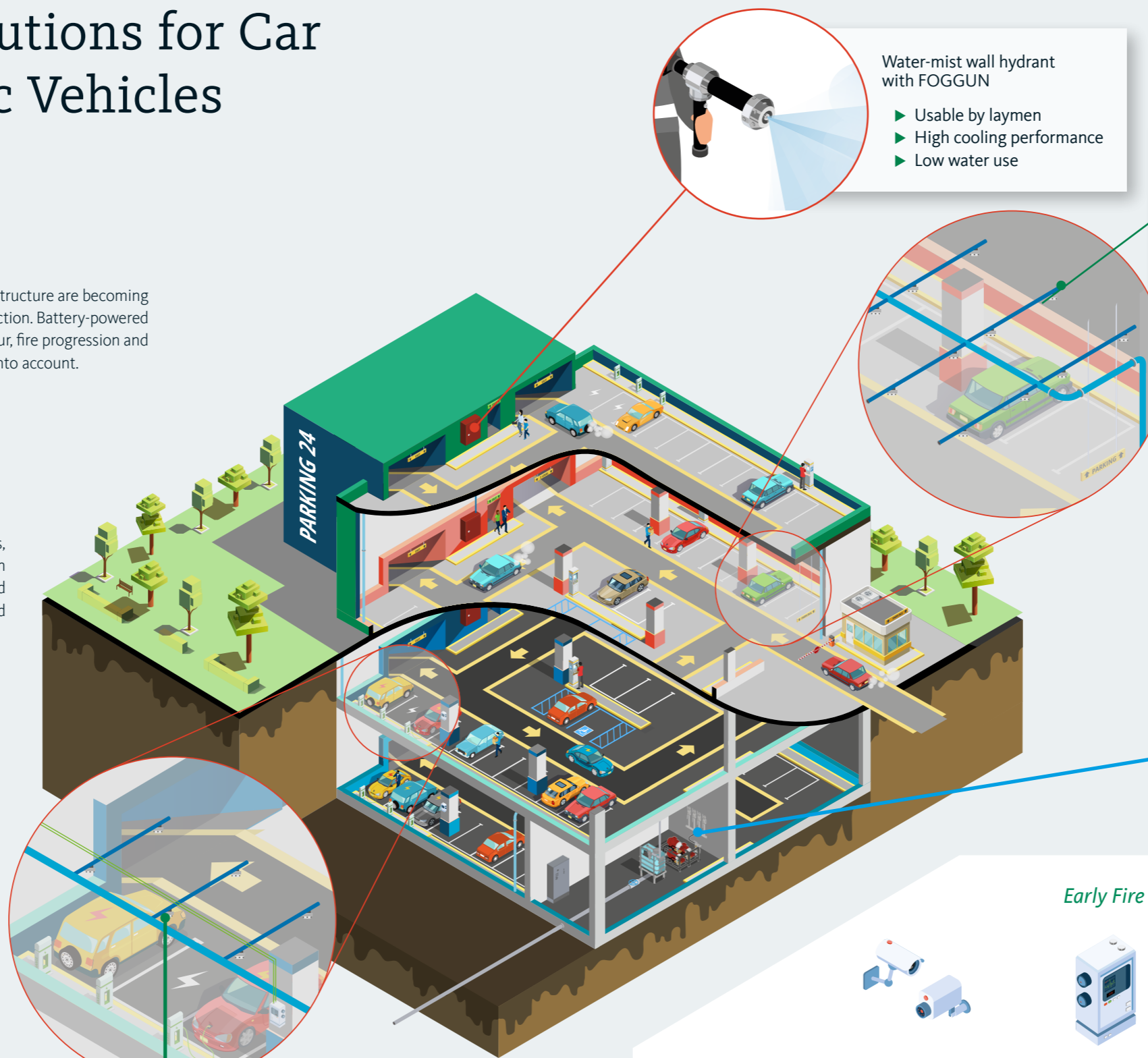
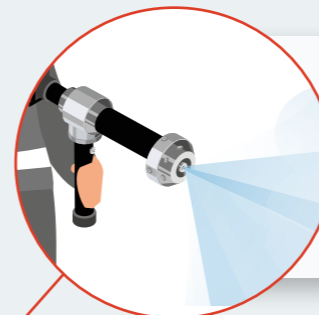
Protection objectives for charging areas

Always:

- ▶ Early fire detection
- ▶ Fast evacuation


Optional:

- ▶ Automatic fire suppression
- ▶ Protection of adjacent cars and the building
- ▶ Reduction of smoke gases
- ▶ Support of the rescue forces

Water-mist wall hydrant with FOGGUN

- ▶ Usable by laymen
- ▶ High cooling performance
- ▶ Low water use



Automatically activating nozzles for the protection of large areas with mixed vehicles


- ▶ Frost-proof
- ▶ Minimal water consumption
- ▶ Partial scrubbing of combustion fumes
- ▶ Very compact design

The protection concept for parking areas with electric vehicles and internal combustion engine vehicles

- ▶ Automatic nozzles
- ▶ Very small piping (d12 to d40)
- ▶ Large nozzle spacing

FOGTEC pump units



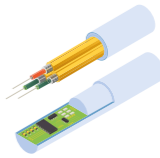

- ▶ Minimal spatial requirements (< 15m²)
- ▶ Compact water break tanks
- ▶ Easily scalable if required
- ▶ Optional: independent power supply



Nozzles for charging areas

- ▶ Instant activation
- ▶ With separate detection
- ▶ Frost-proof
- ▶ Minimal water consumption
- ▶ Partial scrubbing of combustion fumes
- ▶ Very compact design

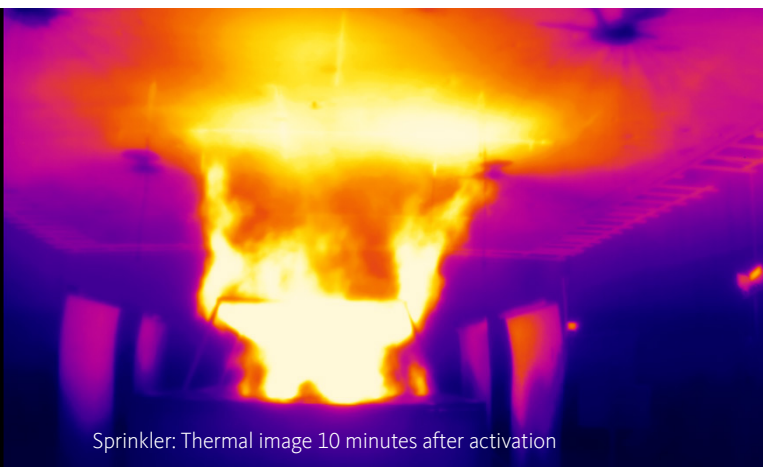
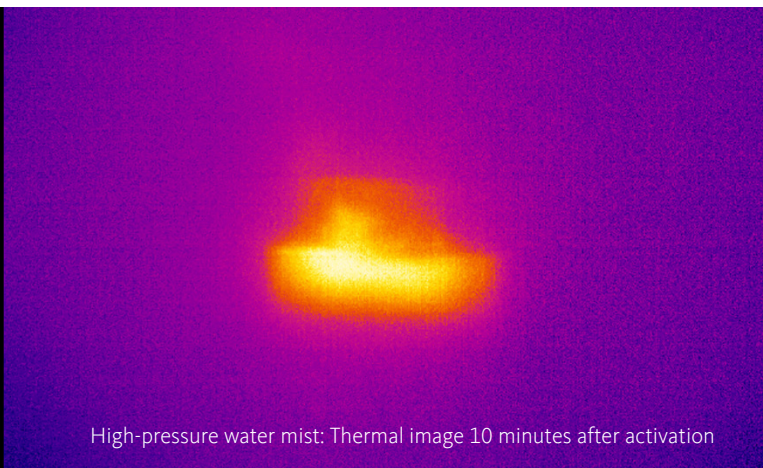
Early Fire Detection = Effective Fire Fighting

	 Video-based surveillance	 Smoke aspiration systems	 Linear heat detectors	 Spot detectors
Advantages	<ul style="list-style-type: none"> ▶ Flame and smoke detection ▶ Video recording 	<ul style="list-style-type: none"> ▶ Highly sensitive early fire detection ▶ Customisable for specific applications ▶ Reliable detection even in difficult environments 	<ul style="list-style-type: none"> ▶ Reliable localisation of the fire ▶ Easy installation ▶ Very robust 	<ul style="list-style-type: none"> ▶ Easy installation ▶ Cost effective ▶ Reacts to smoke or temperature
Application examples	<ul style="list-style-type: none"> ▶ High-risk areas ▶ Areas with high ceilings 	<ul style="list-style-type: none"> ▶ Charging areas and electrical infrastructure 	<ul style="list-style-type: none"> ▶ Large area zones 	<ul style="list-style-type: none"> ▶ All areas with medium ceiling height

Fire Testing

High-pressure water mist and sprinklers comparison

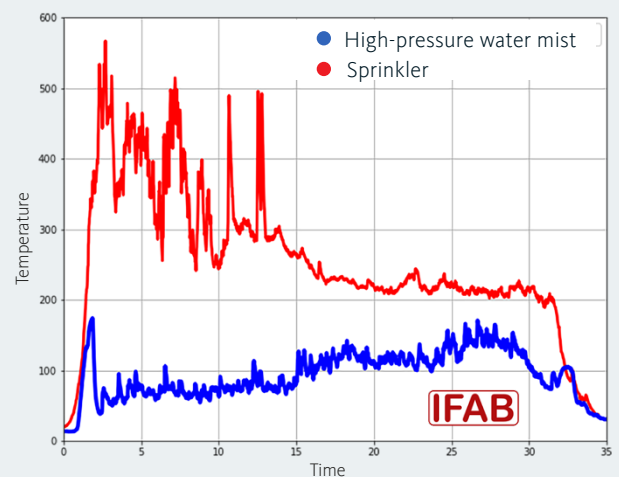
As part of the SUVEREN research project, various technologies for fighting battery fires were subjected to benchmark tests. Water proved to be particularly suitable for fighting vehicle fires. Compared to sprinklers, the small drops of water mist have shown a particularly high cooling effect.



Independent Certification



All fire tests of FOGTEC systems are accompanied and certified by independent third parties. For car parks and underground garages, this was carried out by TÜV Süd and DEKRA.



Ceiling temperatures in the fire test

Fire fighting with high-pressure water mist



Note: Piping diameters and component dimensions not to scale.

FOGTEC for charging stations

- ▶ 100% environmentally friendly
- ▶ Safe for people
- ▶ Based on full scale fire tests
- ▶ Early fire detection
- ▶ Minimal water consumption
- ▶ Easy Installation
- ▶ Minimal maintenance costs
- ▶ Low space requirements
- ▶ For lithium-ion-batteries
- ▶ Consulting, planning, installation



Other FOGTEC fields of innovation:
rolling stock, production areas, laboratories,
automotive test benches, data centres, switchgear,
cable ducts, tunnels, hospitals, museums, archives,
monuments... and many others!



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