Report on the EU legislation, building codes, guidelines on fire safety of EVs recharging infrastructure in covered and above ground parkings

Austria

OIB Guideline 2.2; Safety in case of fire in garages, roofed parking spaces, and multi-storey car parks.

- **Type**: Guidelines issued by the Austrian Institute for Construction Technology (OIB). OIB acts as a coordination platform for the federal states for building products and building technology
- **Scope of Application**: National level, providing comprehensive regulations for fire safety in parking areas, particularly focusing on electric vehicles (EVs) and their recharging points.

Structural Fire Protection

- **Fire Compartments**: The guideline does not specify the use of fire-resistant walls, doors, or gates for compartmentalization. However, it recommends reducing fire risks if EVs cannot be easily removed in case of a fire.
- **Access for Removals of EVs**: No charge points allowed in car parks with car elevators to mitigate fire risks.

Technical Fire Protection

- **Isolation Switch to Cut Power Supply**: An isolation switch is required to cut the power supply in case of an emergency, ensuring that electrical systems can be quickly deactivated during a fire.

Preventive Fire Protection

- **Special Rules for Fast Charging**: Charging stations with power greater than 22kW are only permitted under specific conditions: single-floor car parks on street level with a maximum area of 250 sqm, in fire compartments with automatic extinguishers and 24/7 security center notifications, or in fire compartments with fire alarm systems connected to a 24/7 security center. These stations must also be positioned close to entry and exit points or on floors +1 or -1.

Belgium

Code of Good Practice - Fire Safety for Electric Vehicles in Parking Areas

- **Type**: Guidelines by Fire Forum, NGO striving to improve fire safety by stimulating dialogue, the dissemination of knowledge and information, and the promotion of quality and innovation.
- **Scope:** The Belgian guidelines are applicable at the national level. They provide specific regulations for the fire safety of electric vehicles (EVs) and their recharging points within parking areas across Belgium.

Structural Fire Protection

- **Fire Compartments**: Emphasizes compartmentalization with fire-resistant materials in parking areas. Specific guidelines for the construction and fire stability of parking lots, ensuring they remain structurally sound in the event of a fire.
- **EV Removal Access**: Requirements for ramps and access ways to facilitate the easy removal of EVs. In cases where access is through an elevator, a post-fire alternative must be provided.

Technical Fire Protection

- **Fire Extinguishing Systems**: Evaluations for sprinkler systems in parking lots, especially for existing structures, considering the size of the parking, the number of EVs, and the presence of recharging points.
- **Ventilation and Smoke Extraction**: Guidelines for effective smoke and heat extraction systems, with a focus on preventing explosive or toxic atmospheres. Recommendations for ventilation openings at each parking space equipped with a charging station.

Organisational Fire Protection

- **Risk Assessment and Emergency Planning**: Parking operators are required to conduct risk assessments and collaborate with firefighters for emergency planning. Post-fire, it's essential to check the stability of EV batteries before allowing vehicles to remain in the parking.

Preventive Fire Protection

- **Recharging Point Regulations**: Recommends avoiding Mode 1 and 2 recharging points due to safety concerns. Mode 4 charging stations require technical justification and local fire department approval.
- **Installation and Maintenance**: The installation of EV charging stations must comply with specific electrical regulations. Regular inspections and a logbook for initial and periodic inspections are advised.

France

Building code established by the order of June 25, 1980, further detailed by the order of May 9, 2006.

- **Type**: Building code by the French Ministry
- **Scope of Application**: National level, with explicit specifications related to electric vehicles (EVs) and recharging points.

Structural Fire Protection

- **Compartmentalization**: Parking lots are divided into compartments not exceeding 3000 square meters, extendable to 6000 square meters with sprinkler systems. Compartment walls require a minimum fire-stop rating of one hour. Automated storage areas and partition walls are subject to stringent fire-resistance standards.
- **Access and Egress**: Regulations specify maximum walking distances to exits or staircases, with staircases either enclosed in fireproof walls or located outdoors.

Technical Fire Protection

- **Fire Suppression Systems**: Installation of automatic sprinkler systems is mandated for covered parking lots with more than two levels.
- **Smoke and Heat Extraction**: Mechanical extraction is required for most scenarios, with extraction rates detailed per vehicle and compartment size. Fire alarm systems and smoke detectors are essential for large-capacity parking lots.
- **Hydrants and Firefighting Measures**: Detailed provisions for hydrant installations and the presence of portable fire extinguishers at strategic locations.

Organisational Fire Protection

- **Safety Recommendations**: Prohibitions on combustible material storage, fuel addition, smoking, or open flames within the parking area.
- **Firefighters' Access and Water Supply**: Specifications for the installation of dry columns and hydrants to ensure adequate water supply for firefighting.

Preventive Fire Protection

- **Recharging Points**: Limits on the number of charging points per compartment and the total deliverable power. Specific conditions are outlined for the installation of fast charging points, emphasizing the need for isolation and fire-resistant barriers.
- **Maintenance and Inspection**: Regular inspection schedules for electrical installations and recharging points, emphasizing operational safety and compliance with national and international standards.

Fire Prevention Guide for Covered Parking Areas

- **Type**: Guidelines by the Ministry of Interior
- **Scope of Application**: Specifically tailored to covered public parking lots accommodating more than 10 vehicles, with a focus on fire safety measures for EV recharging points.

Structural Fire Protection

- **Compartmentalization and Materials**: The guidelines specify requirements for fire-resistant materials and compartmentalization in parking structures to limit fire spread and damage.
- **Access and Evacuation**: Detailed provisions for access and evacuation routes, including emergency exits and signage, ensuring quick and safe egress during a fire incident.

Technical Fire Protection

- **Fire Detection and Suppression Systems**: Recommendations for installing advanced fire detection systems and suppression equipment, particularly in areas housing EV charging stations.
- **Ventilation and Smoke Control**: Emphasizes the importance of adequate ventilation systems and smoke extraction measures, tailored to the unique challenges posed by EV battery fires.

Organisational Fire Protection

- **Emergency Procedures and Training**: Guidelines for developing comprehensive emergency response plans, including staff training on handling EV-related fires.
- **Coordination with Fire Services**: Stipulations for coordination with local fire services for effective emergency response and management.

Preventive Fire Protection

- **Charging Point Regulations**: Specific rules and limitations on the installation of EV charging points, focusing on reducing fire risks associated with electrical faults or battery malfunctions.
- **Regular Inspections and Maintenance**: Mandates regular inspections and maintenance of EV charging infrastructure to ensure ongoing compliance with safety standards.

Additional Safety Measures

- **Public Awareness and Safety Information**: Encourages the dissemination of safety information to the public regarding the use of EV charging points and fire safety measures in parking areas.

Germany

Model regulation on the construction and operation of garages and parking spaces (Model Garage and Parking Space Regulation M-GarVO1)

- **Type**: Building code issued by the Conference of Ministers for Construction (a conference of specialist ministers of the German states)
- **Scope of Application**: National level, providing detailed guidelines for fire safety in parking structures, particularly those housing electric vehicles (EVs) and recharging points.

Structural Fire Protection

- **Fire Compartments**: Emphasizes the importance of fire-resistant walls, doors, and gates for compartmentalization, with specific requirements varying based on the size and type of garage, and whether the garage is above or below ground. Materials must range from low flammability to non-combustible, ensuring structural stability in the event of a fire.

Technical Fire Protection

- **Fire Extinguishing Systems**: Depending on the size and type of the garage, various fire extinguishing systems are required, including dry water supply lines, semi-stationary spray water extinguishing systems, high-expansion foam extinguishing systems, and automatic fire extinguishing systems.
- **Smoke and Heat Extraction Systems**: Closed large garages must have mechanical smoke and heat extraction systems to manage fire-related smoke and heat.
- **Fire Detection Systems**: Garages larger than 2500 square meters must be equipped with fire alarm systems with both non-automatic and automatic fire detectors. If medium to large garages are connected to other parts of the building, a fire alarm system is required.
- **Safety Lighting and Signs**: Depending on the size of the closed garage, escape lighting and safety signs (for large closed garages) or lighted signs for emergency exits (minimum 30 minutes without power) are required.

Organisational Fire Protection

- **Firefighters' Water Supply and Access**: At feed-in points of the water supply, movement areas must be provided for fire brigade vehicles, with the feed-in points not being more than 15 meters away. These points must be determined in agreement with the fire protection department.

Italy

Guidelines for the installation of electric vehicle charging infrastructure

- **Type**: Guidelines by the Italian firefighters
- **Scope of Application**: National level, including specific guidelines for the installation and management of EV recharging points.

Structural Fire Protection

- Italy's guidelines focus on fire risk assessment and mitigation in spaces where EV recharging points are installed. While there are general rules for places at risk of fire, the charging of electric vehicles is not considered to significantly change the risk level. The guidelines emphasize the importance of complying with fire prevention controls in places subject to such procedures.

Technical Fire Protection

- **Fire Extinguishers and Systems**: Mandates portable fire extinguishers at EV recharging points, suitable for electrical systems.
- **Emergency Controls**: Charging stations must have an emergency release control device for electrical isolation in emergencies.
- **Installation Safety**: Specific recommendations are made to avoid installation in areas with flammable gases or vapors.

Organisational Fire Protection

- The guidelines stipulate regular checks and documentation following any changes or modifications to the charging station, ensuring ongoing compliance with fire safety standards.

Preventive Fire Protection

- **Recharging Point Types**: Only mode 3 and mode 4 recharging points are allowed, with prohibitions on mode 1 and mode 2.
- **Inspection and Maintenance**: Regular visual inspections of recharging points are required, with at least weekly checks.
- **Installation Specifications**: Emphasizes grounding of power cables with metal shielding.

Luxembourg

Fire prevention regulations - Covered parking for more than 20 vehicles

- **Type**: Technical Regulation developed and applied jointly by the fire brigade and the labor inspectorate.
- **Scope of Application**: National level, with specific focus on fire safety in covered parking lots accommodating more than 20 vehicles, including specifications for EV recharging points.

Structural Fire Protection

- **Fire Compartments and Materials**: Emphasis on the use of fire-resistant materials and compartmentalization within parking structures. Specific mentions about the fire stability of the structure and the fire-resistance rating of floors, walls, and ceilings.
- **Accessibility**: Provisions for vehicle impact resistance in construction elements and adequate floor smoothness and impermeability. Minimum height restrictions for obstacles in parking lots to facilitate user movement and EV access.

Technical Fire Protection

- **Fire Extinguishing Systems**: Requirements for standardized portable fire extinguishers based on the number of cars per level. Enclosed parking lots of certain categories must have sprinkler systems.
- **Ventilation and Gas Control**: Mechanical ventilation systems are mandated to prevent stagnation of noxious or flammable gases, with specifications for natural ventilation and extraction circuit design.
- **Smoke Detectors and Fire Alarm Systems**: Obligatory installation of fire detection systems and fire/smoke doors linked to these systems. General alarm systems with push-button activation on all floors.

Organisational Fire Protection

- **Safety Recommendations**: Guidelines for slip-resistant vehicle and pedestrian walkways to enhance safety in the parking environment.

Preventive Fire Protection

- **EV Recharging Points**: Allows for normal and rapid recharging in charge modes 2, 3, and 4, using standards-compliant terminals and cables. Specific rules for electrical hazard management near charging stations and requirements for power supply cutoff by fire detection systems in case of alarms.

Norway

Regulation on low-voltage electrical installations

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- **Type**: Regulation issued by the Norwegian Ministry of Justice and Public Security
- **Scope of Application**: National level, including specific guidelines for the installation and safety of electric vehicle (EV) recharging points in parking areas.

Structural Fire Protection

- **Fire Compartments**: Electrical installations such as appliance panels and distribution cabinets must be clearly arranged, easily accessible, and made of non-combustible, mechanically resistant materials. Wiring systems should avoid escape routes but, if necessary, must be protected to prevent fire spread or excessive temperatures.
- **Access for Removals of EVs**: Wiring systems in escape routes should be out of reach or protected against mechanical damage. It is recommended to use cables with insulation that does not emit harmful amounts of toxic gases during a fire.

Technical Fire Protection

- **Smoke Detectors and Fire Alarm Systems**: Electric heating systems with forced air circulation must have independent thermostats and thermal release mechanisms to disconnect heating elements if high temperatures occur.

Preventive Fire Protection

- **Initial Control and Inspection of Recharging Points**: Electrical equipment must not endanger safety when installed and maintained correctly. Emergency disconnection equipment must be installed where quick disconnection is necessary to avoid danger.
- **Maintenance of Recharging Points**: Regular inspections are recommended, particularly in homes every ten years and more frequently in industrial or agricultural settings. The installation must ensure accessibility for maintenance, repair, and testing without danger.

Poland

In Poland, different legislation/guidelines/building codes cover fire safety of EV recharging points in covered/above ground parkings:

Regulation of the Minister of Energy on the Technical Requirements for Charging Stations and Charging Points

- **Scope**: National level, specific to EV charging points.
- **Fire Protection Aspects**: Charging points must be located outside potentially explosive zones. Requires a technical examination of charging devices, including a fire protection expert's opinion.

Act on Electromobility and Alternative Fuels

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- **Scope**: National level, covers installation of EV charging points in buildings.
- **Fire Safety Requirements**: Expert opinion on fire safety required for installation in multi-family residential buildings. Sets the standard for the number of EV charging points in new and renovated buildings.

Regulation of the Minister of Interior and Administration on Fire Protection Device Design

- **Scope**: National level, specific to fire safety in building design.
- **Technical Fire Protection**: Includes requirements for fire-fighting water supply systems with hydrants in garages. Specifies types of fire extinguishers and their placement based on garage size.

Act of July 7, 1994, Construction Law

- **Scope**: National level, relevant to construction and electrical installations.
- **Organisational Fire Protection**: Regulates the qualifications of designers, installers, and maintainers of electrical installations, including those for EV charging points.

Energy Law

- **Scope**: National level, relates to the operation of electrical devices.
- **Organisational Measures**: Details the qualifications and authorizations required for operators of EV charging points, ensuring compliance with safety and operational standards.

Romania

"Normative document regarding fire safety in underground car parks" code NP 127: 2009.

- **Type**: Technical regulation
- **Scope of Application**: National level, with specific provisions for electric vehicles (EVs) and recharging points in underground car parks.

Structural Fire Protection

- The Romanian guidelines focus on the structural aspects of fire safety in underground parking facilities, although specific mentions of fire compartments, access for EV removals, or other structural fire protection measures are not explicitly detailed in the document.

Technical Fire Protection

- **Ventilation Systems**: The guidelines mandate adequate ventilation systems at battery charging locations for electric cars to manage smoke and heat effectively.

Preventive Fire Protection

- **Limitation on Recharging Points**: The document restricts the number of battery charging equipment and terminals for electric cars to three for each car park. It also specifies that electric sockets for charging cars equipped with batteries and an internal charger, which do not produce hydrogen emissions, can be unlimited.
- **Connected Activities**: The guidelines authorize areas for connected activities, including battery charging points for electric cars, without requiring additional fire safety measures during the normal operation of underground car parks.

Slovakia

ATN® _010 Safety aspects of electromobility - Garages in residential and non-residential buildings with parking spaces with infrastructure for electric cars.

- **Type**: ATN® 010 is a technical standard drafted by Slovak association for passive fire protection in April 2021 (currently under revision process). Guidelines on electromobility by the Ministry of the Interior of the Slovak Republic, the Presidium of the Fire and Rescue Corps is another document developed by this national authority in December 2021. Both documents contain some similar and some different fire safety requirements in relation to electric vehicle charging and parking in garages (documents are not legally binding and designers can choose which one to apply)
- **Scope of Application**: National, focusing on fire safety in relation to electric vehicle charging and parking in garages.

Structural Fire Protection

- **Fire Compartments**: Utilizes fire-resistant materials to segregate parking areas, with varying degrees of fire resistance required depending on the garage level.
- **Design and Layout**: Encourages a limited number of EV parking spaces within a single fire compartment to mitigate risk.

Technical Fire Protection

- **Fire Suppression**: Recommends sprinklers in defined garage areas, tailored to the parking structure's complexity and size.
- **Detection and Alarms**: Mandates automatic fire detection in larger parking areas, especially those underground, to ensure rapid response.
- **Smoke control system:** Recommends installation of smoke and heat exhausting system in defined garage areas with the sufficient capacity based on parking structure's complexity and size.

Organisational Fire Protection

- **Personnel Training**: Stresses the importance of training for staff on emergency procedures specific to EV fires, including the use of fire extinguishers and power isolation.
- **Emergency Preparedness**: Advises on the development of comprehensive emergency plans that incorporate the unique challenges posed by electric vehicles.

Preventive Fire Protection

- **Installation and Maintenance**: Dictates strict guidelines for the installation of charging points, emphasizing regular maintenance and safety inspections.
- **Location Guidelines**: Provides specific recommendations for the placement of charging stations to facilitate emergency access and evacuation.

Spain (Barcelona)

Technical guide "Electric vehicle recharging installations"

- **Type**: Guidelines developed by the firemen of Barcelona.
- **Scope of Application**: Local level, specifically tailored to Barcelona, with explicit guidelines for EV recharging points within the city.

Structural Fire Protection

- **Fire Compartments and Separation**: Mandates separation between EV Supply Equipment (EVSE) and parking spaces without EVSE, specifying distances or the use of E60 primary barriers for different power ranges of EVSE.
- **EV Removal Access**: Requires that EVSEs be located near facility entrances, enhancing accessibility for emergency services.
- **Evacuation Conditions**: Installation of EVSE must not compromise existing evacuation routes, ensuring safety during emergencies.

Technical Fire Protection

- **Fire Extinguishing Systems**: Outlines requirements for sprinklers and hose reels based on the power output of the connecting point, enhancing fire suppression capabilities.
- **Smoke Extraction and Detection**: Specifies the need for temperature control and smoke extraction systems for high-power EVSEs, alongside fire detection requirements to ensure early warning.
- **Hydrants and Safety Signage**: Installation of hydrants within proximity and information panels for firefighters, providing essential details for emergency response.
- **Power Supply Isolation**: A main switch to cut off all EVSEs, with automatic operation in areas equipped with sprinklers or fire detection, ensuring quick response to fires.

Organisational Fire Protection

- The guide does not explicitly detail organizational fire protection measures such as personnel training or fire fighting strategies within the quoted sections.

Preventive Fire Protection

- **Recharging Point Regulations**: Delineates where EVSEs can be installed based on their power output, emphasizing safety in residential areas and hospitals.
- **Inspection and Maintenance**: Highlights the importance of initial inspections and ongoing maintenance to ensure the safe operation of EVSEs, governed by specific regulations.

Switzerland

Guidelines on lithium-on batteries

- **Type**: Guidelines developed by Swiss association of insurers
- **Scope of Application**: National level, with clear specifications linked to electric vehicles and recharging points.

Structural Fire Protection

- The Swiss guidelines include stringent requirements for fire-resistant walls, doors, gates, and bulkheads to create effective fire compartments. The code specifies detailed fire stability ratings for structures and fire-resistance ratings for floors, walls, and escape routes. There are also clear regulations for the surface area of fire compartments in underground and above-ground car parks.

Technical Fire Protection

- **Fire Extinguishing Systems**: The code outlines the necessity of sprinkler installations in parking lots and garages based on specific criteria related to the fire compartment area and the building's structure.
- **Smoke and Heat Extraction Systems**: Requirements for smoke and heat extraction installations in parking areas are detailed, varying based on the size and type of the parking facility.
- **Safety Lighting and Signs**: There are provisions for emergency and safety lighting, signage for escape routes, and emergency signs with lighting requirements.
- **Isolation Switch for Power Supply**: The code mandates the installation of safety power supply systems for emergency lighting and fire protection equipment, with specific criteria for their operation and installation.

Organisational Fire Protection

- The Swiss guidelines emphasize the need for a fire protection safety officer in larger buildings and complexes. These officers are responsible for ensuring fire safety and compliance with construction and equipment fire protection requirements.

Preventive Fire Protection

- The code does not explicitly detail preventive measures specific to EV recharging points. However, it includes general provisions for the fire protection of parking lots and the restriction of mixed-use in areas designated for motor vehicles.

The Netherlands

IFV Guidelines "Fire safety of parking garages with electrically powered vehicles"

- **Type**: Guidelines by IFV, now NIPV, the Netherlands Institute for Public Safety.
- **Scope of Application**: National level, providing specific fire safety regulations for parking garages that accommodate electric vehicles (EVs) and recharging points.

Structural Fire Protection

- **Fire Compartments**: The guideline recommends compartmentalizing parking garages into fire compartments or shielding between vehicles using physical fire separations such as walls, cladding, or fire screens. Additional recommendations include fire-resistant separation of the parking garage from adjacent spaces and the use of fire-resistant doors or shutters.
- **Access for Removals of EVs**: EVs should not be placed where ventilation air is supplied, such as near the open facade of the parking garage. Placing EVs near entrances is preferable for easier removal. A plan should be developed to move EVs outside after a fire has been extinguished.

Technical Fire Protection

- **Fire Extinguishing Systems**: The installation of sprinkler or water mist systems is recommended, with these systems typically equipped with thermal detectors.
- **Smoke and Heat Extraction Systems**: The guideline suggests using smoke traps to prevent smoke from reaching escape routes, installing fire detection systems with smoke and/or heat detectors, and implementing gas detection systems for carbon monoxide. Exhaust ducts should be strategically positioned to manage smoke effectively.
- **Isolation Switch to Cut Power Supply**: A facility must be available to switch off charging points, including a manual stop button, to ensure there is no electrical voltage during a fire. Various methods for switching off power are suggested, including vandalism-resistant emergency buttons and emergency switches/buttons on or near each charging station.

Organisational Fire Protection

- **Safety Recommendations**: Residents and users should be given clear instructions on what to do in case of a fire. Fire detection systems should be connected to a fire alarm system that reports to a private alarm center responsible for verifying reports and alerting the fire brigade if necessary. Sufficient cooling capacity should be available for firefighting.

Preventive Fire Protection

- **Location of Recharging Points**: Charging points should be located as close as possible to the entrances and exits of the garage, preferably at street level, and concentrated in specific locations within the parking garage. Charging points must be mode 3 or mode 4. Collision protection should be installed in front of the charging stations or positioned to prevent collisions.

United Kingdom

RC59 by FPA: Recommendations for fire safety when charging electric vehicles.

- **Type**: Guidelines developed by the UK Fire Protection Association (FPA)
- **Scope of Application**: National level, with specifications directly linked to electric vehicles or recharging points.

Structural Fire Protection

- **Fire-Resistant Materials and Construction**: Although not explicitly detailed in the quoted sections, the overarching guidelines like RC59 typically recommend the use of fire-resistant materials in the construction of EV charging areas. This would involve specifications for the structural integrity of charging stations, ensuring they are built to withstand fire for a specified period, thereby preventing the spread of fire within a facility.
- **Design and Layout Considerations**: The guidelines would likely advocate for the strategic placement of EV charging points to minimize fire risks, such as avoiding densely packed areas or locations that could impede emergency access or egress. The layout should facilitate quick isolation of any incidents to prevent fire spread.
- **Protective Barriers**: Recommendations may include the installation of physical barriers or protective measures to shield charging points from mechanical damage, which could lead to electrical faults and subsequent fire risks.

Technical Fire Protection

- **Sprinkler Systems**: Consideration for sprinkler protection in underground car parks, designed and maintained according to LPC Sprinkler Rules and BS EN 12845.
- **Automatic Fire Detection (AFD)**: Internal EV charging areas should be equipped with AFD installations, tested weekly and maintained in accordance with BS 5839-1.
- **Fire Fighting Measures**: Strategies include a fire risk assessment and emergency plan, with clear information available for emergency responders on the locations of EV charging points.

Organisational Fire Protection

- **Personnel Training**: Training for the safe use of charging equipment and actions in case of fire, including power isolation and evacuation procedures.
- **Emergency Plan**: Development of an emergency plan for fire incidents, emphasizing manual isolation of charging points for safety.

Preventive Fire Protection

- **Location and Maintenance of Recharging Points**: Charging points should ideally be located outside, with clear differentiation for rapid charging points due to associated hazards. Maintenance to be performed by competent electricians.
- **Standardisation and Safety Measures**: Design considerations for disabled users, clear marking of vehicle parking bays, and comprehensive fire risk assessments to consider the risk from charging electric vehicles. Measures to prevent flammable material storage within charging areas and maintenance protocols for faulty chargers.

Risk Control Guide by RSA

- **Type**: Guidelines drafted by UK insurers
- **Scope of Application**: National, with specific attention to electric vehicles and recharging points.

Structural Fire Protection

- **Fire Compartments**: Advocates for a minimum of 120 minutes fire resistance for all parts of car parks, including structural members and separation between vehicle groups.
- **Design Considerations**: Recommendations include preventing the spread of fires through design features like floor slopes and drainage to control liquid flows.

Technical Fire Protection

- **Sprinkler Systems**: Stresses the importance of sprinkler protection, especially for below-grade car parks, adhering to high standards such as LPC and NFPA.
- **Fire Detection and Alarms**: Installation of smoke detection systems with settings to avoid false alarms from vehicle exhausts, linked to a constantly attended location.
- **Isolation Switches**: Emergency isolation switches for vehicle charging should be accessible for emergency shutdown.

Organisational Fire Protection

- **Personnel Training**: Training for the use of fire blankets and actions in the event of a fire is emphasized, including charging shutdown and evacuation.
- **Fire Fighting Measures**: Utilization of vehicle fire blankets and appropriate fire extinguishers, with CO2 or dry powder recommended for general fires.

Preventive Fire Protection

- **Charging Point Location**: Guidance on avoiding unsprinklered below-grade areas for chargers, with a preference for roof areas or well-ventilated locations.
- **Maintenance and Inspection**: Establishes protocols for regular inspections and maintenance of charging equipment by competent personnel.

T0194 – Covered Car Parks - Fire Safety Guidance for Electric Vehicles by ARUP

- **Type**: Guidelines drafted by Arup, a collective of engineering and sustainability consultants, designers, architects and experts working globally.
- **Scope of Application**: This guidance applies nationally, focusing on the fire safety measures required within covered car parks that accommodate electric vehicles (EVs), addressing both new designs and modifications to existing structures.

Structural Fire Protection

- **Material Requirements**: The guidance specifies the use of fire-resistant materials in the construction of EV parking areas to prevent the ignition and spread of fire. It suggests materials with a minimum fire resistance rating, aiming to contain fires within localized areas and prevent structural collapse.
- **Design Considerations**: Emphasizes the importance of car park layouts that facilitate fire containment and egress during emergencies. Recommendations include adequate spacing between parked EVs, the use of physical barriers to protect EV charging points, and ensuring that EV charging areas are easily accessible for firefighting efforts.

Technical Fire Protection

- **Fire Detection Systems**: Advocates for the installation of comprehensive fire detection systems that include smoke alarms and thermal imaging to quickly identify fires within EV charging areas.
- **Fire Suppression Systems**: Suggests the integration of automatic fire suppression systems, such as sprinklers, specifically designed to address the unique challenges posed by EV fires. These systems should be capable of activating in the early stages of a fire, providing critical response time for evacuation and firefighting efforts.
- **Emergency Power Cut-off**: Stresses the need for easily accessible emergency power cut-off mechanisms for EV charging stations to quickly isolate electrical supply in the event of a fire, minimizing the risk of electrical fires spreading.

Organisational Fire Protection

- **Emergency Response Planning**: Requires the development of specific emergency response plans for EV fires, including evacuation protocols and the role of staff in emergency management. Training for staff on the use of fire safety equipment and procedures for safely handling EV fires is also emphasized.
- **Information Sharing with Fire Services**: Encourages the sharing of detailed plans and information about the location and operation of EV charging stations with local fire services to aid in emergency planning and response.

Preventive Fire Protection

- **Regular Inspections and Maintenance**: Mandates regular inspections and maintenance of EV charging stations to ensure they remain in good working order and compliant with fire safety

standards. This includes the inspection of electrical connections and the physical condition of charging points.

- **Risk Assessments**: Recommends conducting detailed risk assessments that consider the specific hazards associated with EV charging in covered car parks. These assessments should inform the design, operation, and emergency planning for car parks to ensure a comprehensive approach to fire safety.