

Technical Guidelines for Electric Vehicle (EV) Charging-enabling for Car Parks of New Building Developments

Purpose

The Development Bureau announced in October 2010, in its package of measures to foster a quality and sustainable built environment, that in future concessions on Gross Floor Areas (GFA) for car parks will only be granted, inter alia, where car parks are “EV charging-enabling”. The technical guidelines below prescribe the requirement for being EV charging-enabling, which comprises the “General Requirements” and the “Specific Requirements”.

General Requirements

2. “EV charging-enabling facilities” shall mean (a) fixed electrical installations (FEI) on the consumer side including, but not limited to, switchboards, distribution boards, electricity meter boards, cabling, conduits and trunking; and (b) EV chargers. Electricity meters¹ for the EV chargers are optional items for the purpose of EV charging-enabling for car parks of new building developments.
3. EV charging-enabling facilities shall be designed, installed, tested and certified by registered electrical contractor and registered electrical worker of the appropriate grade in accordance with the relevant provisions of the Electricity Ordinance (Cap. 406) and its regulations.
4. EV charging-enabling facilities shall be installed in compliance with the relevant requirements of the Code of Practice for the Electricity (Wiring) Regulations and Technical Guidelines on Charging Facilities for Electric Vehicles published by the Electrical and Mechanical Services Department and prevailing at the time of submission of Building Plans.

¹ Owners of the parking spaces can apply for electricity meters for the EV chargers installed at their parking spaces suiting their own needs at appropriate time, hence this item is optional for the purpose of EV charging-enabling for car parks of new building developments.

Specific Requirements

5. All parking spaces for private cars, motorcycles and light goods vehicles in the concerned car park shall be provided with EV charging-enabling facilities.

6. The main switchboard(s) shall be designed and installed with sufficient capacity and compartments to supply power to distribution boards for simultaneous charging at all parking spaces for private cars, motorcycles and light goods vehicles, each equipped with an EV charger with output power not less than 7 kW (i.e. medium charger). In addition, switchgear compartments with adequate 3-phase electrical loading capacity shall be reserved in the main switchboard(s) for the parking spaces for coaches, light buses, medium goods vehicles and heavy goods vehicles. The power to be reserved shall comply with the requirements stipulated in Appendix I, in which an illustrative example for calculation of the reserved power capacity required for provision of EV charging-enabling facilities for a car park is provided for reference. It shall be taken that under normal use, each single charging point is used at its rated current. Since all the connecting points of the EV chargers may be used simultaneously, the diversity² of the distribution circuit shall be taken as equal to 1 unless a load control³ is included in the EV charger or installed upstream of it or a combination of both. The diversity factors to be applied to different types of parking spaces shall follow the requirements stipulated in Appendix I.

7. The design of FEI for the EV charging-enabling facilities shall not, in any way, cause undue interference that impairs the safety and stable operation of the FEI of the building and the power supply system of electricity supplier.

8. Distribution board(s) shall be of suitable design and shall be installed at strategic locations on each level of a car park covering EV charging-enabling facilities. The power supply to the distribution boards should be designed for charging at all parking spaces at the same time. Where load control is adopted, the maximum EV charger load on a dedicated distribution circuit shall be the maximum load permitted by the corresponding load control to prevent overloading.

² Diversity: The ratio of the maximum demand to the connected loads

³ Load Control: Electrical (energy) management system which ensures that the sum of load currents of dedicated circuits does not exceed a predetermined value

9. All the final circuits⁴ shall be designed and installed up to the EV charger interface with suitable circuit protective devices, residual current devices and electrical cabling of suitable design in accordance with the Code of Practice for the Electricity (Wiring) Regulations and Technical Guidelines on Charging Facilities for Electric Vehicles. The electric cable of each final circuit shall be sized to carry a minimum charging current of 32A single phase with due consideration on voltage drop constraint. These requirements do not apply to parking spaces for coaches, light buses, medium goods vehicles and heavy goods vehicles. A summary table listing the requirements for EV charging-enabling for different types of parking spaces is provided at Appendix II for easy reference.

10. EV chargers provided shall comply with international/national standards for EV charging. A minimum corridor width of 250mm and 400mm shall be reserved for installation of EV chargers for backside wall and back to back configurations of the parking spaces respectively.

Other considerations

11. Adequate space should be provided in meter room(s) or switch room(s)/cabinets with electricity meter boards installed for installation of electricity meter(s) for all the individual parking spaces. Electricity meter(s) may be provided in consultation with electricity company and their provisions are dependent on the metering method for the charging facilities. The installation of electricity meter(s) shall be optional. If provided, such details shall be incorporated into the building plans during planning stage.

12. Quick charging facilities are not covered by this set of guidelines. Property developers may consider installing quick charging facilities on their own commercial or other considerations.

13. As a means to fully utilise the available electricity supply for EV charging circuits, it is anticipated that adoption of load control (e.g. load management system) will become more popular. In this regard, consideration shall be given to the compatibility with different brands of EV chargers in selecting load management systems (LMS). In particular, those

⁴ Final Circuit: A circuit connected from a local distribution board to a current-using equipment, or to a socket-outlet or socket-outlets or other outlet points for the connection of such equipment.

LMS adopting open communication protocol (e.g. OCPP 1.6J or above) are most desirable as it will ensure compatibility with most EV chargers available in the market adopting the same protocol. Suitable control algorithms shall be devised in the LMS e.g. even distribution and queuing, for selection by clients (e.g. car park owners). To enhance the safety and reliability, fail-safe features shall also be provided in the LMS.

14. Where a load control (e.g. LMS) is adopted, a notification should be provided in the vehicle park to alert users of EV chargers that the actual charging rate (and hence charging time) may be varied with the prevalent demand on the total charging services in the vehicle park.

Submission

15. In support of the application for GFA concession, the following design information together with the Building Plans shall be submitted by the Authorized Person to the Buildings Department (BD) for approval:-

- (i) Schematic diagram(s) for EV charging-enabling facilities indicating main switchboard(s) and distribution board(s) arrangement, and protective devices for the final circuits of EV chargers;
- (ii) Calculation of electricity loading, voltage drop analysis and cabling schedule;
- (iii) Locations of EV chargers and their mounting methods for parking spaces of private cars, motorcycles and light goods vehicles;
- (iv) Location of meter room(s) and/or switch room(s)/cabinets with electricity meter boards installed for mounting electricity meter(s). The provision of electricity meter(s) for EV charger circuits shall be optional; and
- (v) Detailed information of EV chargers and load control(s) if it is employed for the EV charging-enabling facilities.

16. The design of FEI of EV charging-enabling facilities under paragraph 15 shall be certified, before submission, in accordance with the

General and Specific Requirements as set out above by a Registered Professional Engineer (RPE) under the Engineers Registration Ordinance (Cap. 409) of either the Electrical or Building Services discipline.

Installation and Certificate of Completion

17. Prior to the application for occupation of the building, the completion of the works for the EV charging-enabling facilities on site shall be certified by an RPE and the certificate shall be submitted to the BD through the Authorized Person. The certificate should state:-

- (i) The address at which the inspection by the RPE was carried out;
- (ii) Whether or not the EV charging-enabling facilities are in accordance with the design information previously submitted to the Building Authority through the Authorized Person;
- (iii) Whether or not the EV charging-enabling facilities have been fully installed, tested and commissioned; and
- (iv) The name and the registration number of the RPE.

18. A sample format of the certificate is at Appendix III.

Environment and Ecology Bureau
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Application of Diversity Factors for Different Types of Parking Spaces

A. Diversity Factors

Type of Parking Spaces	Total No. of Parking Spaces	Required Output Power @ Charger	Reserved Power Capacity⁵ (per parking space)	Diversity Factor (See Notes)	Percentage of Parking Spaces with Reserved Power Capacity
Private Car / Motorcycle / Light Goods Vehicle ⁶	≤ 150	7 kW	7.2 kVA	1.0	100%
	≥ 151 ≤200			0.9	100%
	≥ 201 ≤300			0.8	100%
	≥ 301 ≤400			0.7	100%
	≥ 401 ≤500			0.6	100%
	≥ 501			0.5	100%
Coach (Bus) / Light Bus	1	100 kW	115 kVA	1	100%
	2			0.5	100%
	3 or more			0.5	80%
Medium Goods Vehicle	1-11	A minimum power not less than 115 kVA shall be reserved			
	Over 11	100 kW	115 kVA	0.3	30%
Heavy Goods Vehicle	1 -33	A minimum power not less than 115 kVA shall be reserved			
	Over 33	100 kW	115 kVA	0.3	10%

⁵ Reserved power capacity means the electricity power which shall be designed and provided for a parking space. The total reserved power capacity for a particular type of parking spaces shall mean the total electricity power required for that type of parking spaces taking into account the number of parking spaces, application of diversity factor (if applicable) and percentage of parking spaces required for reservation of power capacity.

⁶ Light Goods Vehicles include both van-type light goods vehicles and non van-type light goods vehicles.

Notes:

- (1) For application of diversity factors less than 1.0 in the above Table, adoption of a load control, e.g. load management system(s) is a prerequisite. For reliability consideration, it is recommended to employ a load management system dedicated for the parking spaces of Private Car / Motorcycle / Light Goods Vehicle, and another load management system dedicated for the parking spaces of Coach (Bus) / Light Bus, Medium Goods Vehicle and Heavy Goods Vehicle.
- (2) For a shared-use parking space which can be used by either a coach, light bus, medium goods vehicle or a heavy goods vehicle, the requirement of reserved power capacity, percentage of parking spaces with reserved power capacity and application of diversity factors for Coach/Light Bus shall be followed.
- (3) For a shared-use parking space which can be used by either a medium goods vehicle or a heavy goods vehicle, the requirement of reserved power capacity, percentage of parking spaces with reserved power capacity and application of diversity factors for Medium Goods Vehicle shall be followed.
- (4) For a shared-use parking space which can be used by either a light goods vehicle or a light bus, the requirement of reserved power capacity, percentage of parking spaces with reserved power capacity and application of diversity factors for Light Bus shall be followed.
- (5) For private development with some of the parking spaces designated for government exclusive use, the number of parking spaces shall be considered separately.

Summary of requirements for EV charging-enabling for different types of parking spaces

Type of Parking Space	Reserved Power Capacity (per parking space)	Switchgear Compartment	Switchgear	Final Circuit	EV Charger	Electricity Meter
Private Car / Motorcycle / Light Goods Vehicle	✓ (7.2kVA)	✓	✓	✓	✓	Optional
Coach (Bus) / Light Bus	✓ (115kVA)	✓	X	X	X	X
Medium Goods Vehicle	✓ (115kVA)	✓	X	X	X	X
Heavy Goods Vehicle	✓ (115kVA)	✓	X	X	X	X

Notes:

✓ It is required.

X Not required.

Certificate of Completion
Provisions for Electric Vehicle (EV) Charging-enabling
for Car Parks of New Building Developments

To: the Building Authority,

In accordance with the requirements of the Technical Guidelines for Electric Vehicle (EV) Charging-enabling for Car Parks of New Building Developments, I (name in full) _____, registered professional engineer, hereby confirm that I have inspected the car park(s) of the new building at (address of site)

_____ on (Lot No.) _____ and the provisions for EV charging-enabling at the above car park(s) have been fully installed, tested and commissioned. I certify that the completed works of the EV charging-enabling facilities in the car park(s) of the above new building are in accordance with the design information of EV charging-enabling facilities submitted to the Building Authority on _____ through the Authorized Person of this building (Your Ref. No. _____).

Date _____

Signature of Registered Professional Engineer

Registration No. : _____

Date of Expiry of Registration : _____