ESCOM
ELECTRICAL SAFETY COMMITTEE

GUIDELINES AND BEST PRACTICES FOR PUBLIC CHARGING STATIONS AND EV INFRASTRUCTURE

DOCUMENT NO: ESCOM/2026/08, REVISION 1.0

What is ESCOM?

The Safety, Health and Environment National Authority (SHENA) and Autocratic Elektrik Negara Brunei Darussalam (AENBD) established the Electrical Safety Committee or “ESCOM” in January 2023; with the objectives of promoting regulatory compliance and raising electrical safety standards within Brunei Darussalam.

Who are the ESCOM members?

The Electrical Safety Committee (ESCOM) comprises representatives and industry experts drawn from relevant government institutions and private organisations, collectively bringing extensive technical experience in electrical engineering, safety management, and industry practice.

ESCOM is **chaired by a representative from the Safety, Health and Environment National Authority (SHENA)**, with a **Deputy Chairperson appointed in accordance with the Committee’s Terms of Reference**. Subject matter experts from regulatory bodies, utilities, and industry may be invited to participate in specific working groups or provide technical input where required.

ELECTRICAL SAFETY BEST PRACTICES			
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Disclaimer:

This document was developed to provide guidance and recommendations, as well as to serve as an industry reference for best practices with the aim of improving electrical safety practices. This Guideline and Best Practices is not a statutory document and does not create or replace any legal obligations under the Workplace Safety and Health Act (Chapter 277) or its subsidiary regulations. In the event of any inconsistency, the provisions of the WSHA and its subsidiary regulations shall prevail. Accordingly, this document should not be construed as implying any liability nor should it be taken to encapsulate all the responsibilities and obligations of the law.

TABLE OF CONTENTS

TABLE OF FIGURES

LIST OF TABLES

1 INTRODUCTION

1.1 Electrical safety in a factory refers to the identification, prevention, and control of hazards associated with electrical systems and installations that may cause fatality, injury, property damage, or downtime. Such hazards may include equipment malfunctions, defective wiring, and improper grounding, overloading and unsafe work practices.

1.2 Factory Electrical Safety further encompasses the implementation of all protective measures, control systems, policies and operational procedures intended to ensure safety at workplaces, plants and factories from injury-causing hazards due to related risks within factories, plants and industrial premises. It involves all management operations within the plant for protection.

1.3 In today's technologically advanced environment, electricity remains an essential and vital energy source that powers homes, offices, factories, and other industrial facilities. Notwithstanding its importance, electricity also presents significant hazards, including electrical shocks, burns and fatalities, if not properly managed, maintained and controlled.

1.4 Purpose

1.4.1 The purpose of this document is to define the minimum technical requirements and provide guidelines for the guideline provides the minimum technical, safety, and operational requirements specifically related to EVCS in Brunei Darussalam. This document can be used together with the EIR (Electrical Installation Requirement, DES). The provisions in this guideline aim to ensure that EV charging infrastructure is designed, installed, operated, and maintained in a manner that upholds electrical safety, protects public, prevent fire, protect equipment and ensures compatibility with the national grid.

1.4.2 This guideline does not prescribe or govern processes related to obtaining electricity supply approvals, service connections, or metering arrangements from Department of Electrical Services (DES). Such processes shall continue to follow the established procedures, application requirements, and regulations issued by DES and any other relevant authority.

This document is applicable to the following.

1.4.3 Manufacturers, importers, distributors, sellers, and advertisers of EVSE.

1.4.4 Relevant stakeholders engaged in the implementation, installation, operation, and maintenance of EVCS, including but not limited to licensed electrical contractors, competent persons, EVCS service providers, and consulting engineers; and

1.4.5 Any individual or entity intending to install, operate, or maintain an EVCS within Brunei Darussalam.

1.5 Scope

1.5.1 Inclusion

1.5.1.1 The scope of this guideline is limited to requirements applicable to EV charging equipment, protection systems, and associated safety interfaces.

1.5.1.2 It focuses on best practices for EV protection systems, preferred modes of charging, and the maintenance, inspection, and safe operation of EV charging infrastructure.

1.5.2 Exclusion

The following equipment/applications are excluded from the scope of this document:

1.5.2.1 Electrical Vehicles

1.5.2.2 Batteries

2 DEFINITIONS

In this Guidelines, any word or expression to which a meaning has been assigned, shall have the meaning so assigned and, unless otherwise indicated:

2.1 “Can” - used for statements of possibility and capability, whether, physical or causal.

2.2 “Competent person (electricity)” in relation to machinery, means any person who has successfully completed an apprenticeship or accredited programme in an engineering trade which includes operation and maintenance of machinery, or has had at least five years’ relevant practical experience in the operation and machinery to enable them to competently identify, assess, and manage electrical risks and to prevent hazards arising from the use, operation, or maintenance of machinery and electrical installations.

2.3 “Could” - used to indicate an allowable course of action within the limits in this standard.

2.4 Factory - a factory refers to any workplace where the work activity involves people working in connection with manufacturing, processing, repairing, assembling, testing, maintenance, or handling of materials and include construction type activities where electrical hazards may also reasonably arise from such activities[1]. A workplace with factory setting usually involve higher-risk work and such factory include workplaces as also outlined in section 5(2) and section 5(3) of WSHA.

2.5 “Grounding” - provides a path for current to flow into the ground and excess electric charge to disperse instead of building up and creating a potential hazard.

2.6 “Hazard” - A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

2.7 “Shall” - indicates a mandatory requirement strictly to be followed to conform to the standard, and from which no deviation is permitted unless approved by all involved parties.

2.8 “Should” - make a recommendation to indicate that among several possibilities one is recommended as particularly suitable without mentoring or excluding others, or that a certain course of action is preferred, but not necessarily required.

2.9 “Insulation” - means separated from adjoining conducting material by a non-conducting substance which provides resistance to the passage of current, or to disruptive discharges through or over the surface of the substance at the operating voltage, and to mitigate the danger of shock or injurious leakage of current.

[1] Section 5, Workplace Safety and Health Act (Chapter 277).

2.10 "Machinery" includes — (a) any oil engine, gas engine, steam engine and any other machine in which mechanical movement, either linear, rotated or both, takes place; (b) any steam boiler, gas cylinder, air receiver, steam receiver, steam container or refrigerating plant pressure receiver; (c) any appliance for transmission of power by ropes, belts, chains, driving straps or bands or gearing; and (d) any electrical generator or electrical motor, but does not include any machinery used solely for the propulsion of vehicles[2];

2.11 "Verifying" - make sure or prove that (something) is true, accurate, or justified.

3 ACRONYMS AND ABBREVIATIONS

DES	Department of Electrical Services
EIR	Electrical Installation Requirements
EVCS	Electric Vehicle Charging System
EVSE	Electric Vehicle Supply Equipment
IEC	International Electrotechnical Commission
IP	Ingress Protection
PVC/XLPE	Polyvinyl Chloride/Cross-linked Polyethylene
RESS	Rechargeable Energy Storage Systems
SHENA	Safety, Health and Environment National Authority
WSHA	Workplace Safety and Health Act

4 APPLICABLE STANDARDS

4.1 Any party who intends to design, install, operate and maintain the EVCS installation shall adhere to the minimum specified standards.

4.2 These standards define charging methods, communication signals, plug and socket interfaces, and safety requirements. Where applicable, this guideline makes references to the IEC standard.

4.3 This guideline cannot be used alone to specify electrical safety in a factory NEITHER can it be applied to hazardous area classification but shall comply with IEC & BS (British Standards) but not limited to latest standard of the following:

NO.	STANDARDS	DETAILS DESCRIPTION
1	BS 1363-1:2016+A1:2018	13A Plugs, socket-outlets, adaptors and connection units Part 1: Specification for rewirable and non-rewirable 13 A fused plus (Rev 4.0)
2	IEC 60309-1:2021	Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes Part 1: General Requirements
3	IEC 60309-2:2021	Plugs, fixed or portable socket outlets and appliance inlets for industrial purposes - Part 2: Dimensional compatibility requirements for pin and contact-tube accessories

[2] Section 4, Workplace Safety and Health Act (Chapter 277).

NO.	STANDARDS	DETAILS DESCRIPTION
4	IEC 60364-5-52:2009	Low-voltage electrical installations Part 5-52: Selection and erection of electrical equipment - Wiring systems
5	IEC 60364-7-722:2018	Low-voltage electrical installations Part 7-722: Requirements for special installations or locations Supplies for electric vehicles
6	IEC 61439-7:2022	Low-voltage switchgear and control gear assemblies - Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations
7	IEC 61851-1:2017	Electric vehicle conductive charging system - Part 1: General requirements
8	IEC 61851-21-1:2017	Electric vehicle conductive charging system - Part 21-1 Electric vehicle on-board charger EMC requirements for conductive connection to AC/DC supply
9	IEC 61851-21-2:2018	Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply EMC requirement for off board electric vehicle charging systems
10	IEC 61851-23:2023	Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station
11	IEC 61851-24:2023	Electric vehicle conductive charging system - Part 24: Digital communication between a DC EV charging station and an electric vehicle for control of DC charging
12	IEC 61851-25:2020	Electric vehicle conductive charging system - Part 25: DC EV supply equipment where protection relies on electrical separation
13	IEC 61980-1:2020	Electric vehicle wireless power transfer (WPT) systems - Part 1: General requirements
14	IEC 62196-1:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets Conductive charging of electric vehicles Part 1: General requirements
15	IEC 62196-2:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets Conductive charging of electric vehicles - Part 2: Dimensional compatibility and interchangeability requirements for AC pin and contact-tube accessories

NO.	STANDARDS	DETAILS DESCRIPTION
16	IEC 62196-3:2022	Plugs, socket-outlets, vehicle connectors and vehicle inlets Conductive charging of electric vehicles - Part 3: Dimensional compatibility and interchangeability requirements for DC and AC/DC pin and contact-tube vehicle couplers
17	IEC 62305-1:2006	Protection Against Lightning Part 1: General Principles (First Revision)
18	IEC 62840-2:2016	Electric vehicle battery swap system Part 2: Safety requirements
19	IEC 62893-1:2017 +AMDI:2020	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV- Part 1: General requirements
20	IEC 62893-2:2017	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV- Part 2: Test methods
21	IEC 62893-3:2017	Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV- Part 3: Cables for AC charging according to modes 1, 2 and 3 of IEC 61851-1 of rated voltages up to and including 450/750 V
22	IEC 62893-4-1:2020	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 41: Cables for DC charging according to mode 4 of IEC 61851-1 - DC charging without use of a thermal management system
23	IEC 62893-4-2:2021	Charging cables for electric vehicles of rated voltages up to and including 0,6/1 kV - Part 42: Cables for DC charging according to mode 4 of IEC 61851-1 - Cables intended to be used with a thermal management system
24	IEC 62955:2018	Residual direct current detecting device to be used for mode 3 charging of electric vehicles
25	IEC PAS 62840-3:2021	Electric vehicle battery swap system - Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems

NO.	STANDARDS	DETAILS DESCRIPTION
26	IEC TS 62196-3-1:2020	Plugs, socket-outlets, vehicle connectors and vehicle inlets Conductive charging of electric vehicles - Part 3-1: Vehicle connector, vehicle inlet and cable assembly for DC charging intended to be used with a thermal management system
27	IEC TS 62840-1:2016	Electric vehicle battery swap system - Part 1: General and guidance
28	IEC60529:1989/AMD1:1999 /AMD2:2013	Degrees of protection provided by enclosures (IP Code)
29	IEC62752:2016/AMD1: 2018	In-cable control and protection device for mode 2 charging of electric road vehicles

5 INDUSTRY GUIDANCE (TECHNICAL SAFETY)

5.1 MODES OF CHARGING

The four (4) charging modes of EV are specified in the IEC 61851-1 on electric vehicle conductive charging and include Mode 1, Mode 2, Mode 3 and Mode 4.

5.1.1 Mode 1 charging refers to the connection of an EV to a standard socket-outlet of an AC supply socket-outlet using a simple cable and plug that do not contain any pilot or auxiliary contacts for communication or safety functions.

5.1.2 Due to the absence of control and safety mechanisms, Mode 1 charging is not permitted for any EVCS design, installation, operation, or maintenance in Brunei Darussalam.

5.1.3 Only Modes 2, 3, and 4 are permitted.

5.2 Mode 2 - Portable Charging with In-Cable Protection

5.2.1 The Mode 2 charging involves connecting an EV to an AC supply network (mains) with the current rating not exceeding 32A and a voltage not exceeding 230V AC for single-phase or 400V AC for three-phase at the supply side.

5.2.2 This connection uses a standardised plug-and-cable assembly equipped with an In-Cable Control and Protection Device, which provides the necessary control, communication, and safety protection functions during charging.

5.2.3 The In-Cable Control and Protection Device is installed between the plug and the EV as a complete cable assembly, provides the necessary control pilot and safety functions.

5.2.4 An illustration of the Mode 2 Charging System is shown in **Error! Reference source not found.**.

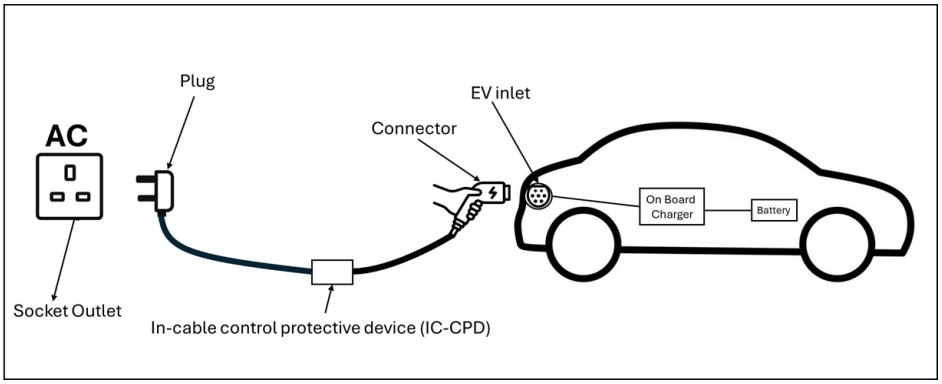

Figure 5-1 - Mode 2 Charging System

5.3 Mode 3 - Dedicated AC Charging

5.3.1 Mode 3 charging is a method for connecting an Electric Vehicle to an AC EVSE that is permanently connected to an AC supply network.

5.3.2 The EVSE is equipped with a control pilot function that extends from the charger to the EV, enabling communication between the EV charger and the vehicle's on-board charger.

5.3.3 This communication supports key safety and operational functions, including verification of proper connection, continuous monitoring of protective earth conductor integrity, controlled energisation and de-energisation of the supply, and selection of the appropriate charging rate.

5.3.4 Subject to the power rating of the on-board charger of an electric vehicle, Mode 3 charging can deliver a higher charging current (e.g. 230V/32A, 400V/32A, 400V/63A) and hence, a shorter charging time.

5.3.5 Selection of EV Charger depends on the charging protocol of the EV and on advice of the EV manufacturer.

5.3.6 Figure 5-2 illustrates a Mode 3 (Case A) connection of an EV to the supply network by using a cable and connector that are permanently attached to the EV.

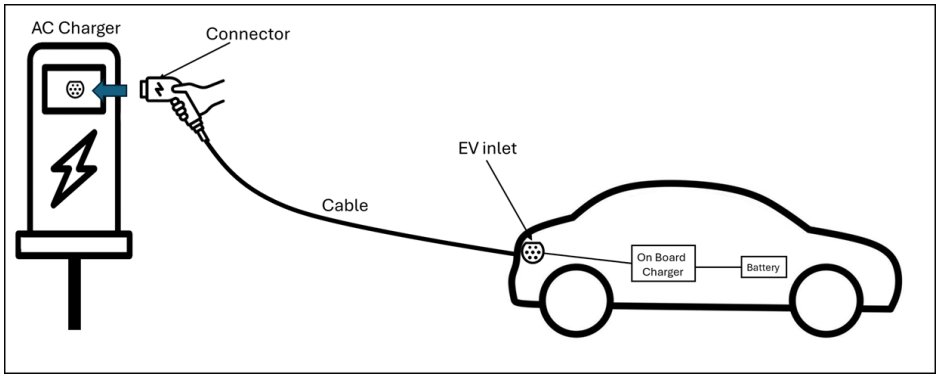

Figure 5-2 - Mode 3 (Case A Connection)

5.3.7 Figure 5-3 illustrates a Mode 3 (Case B) connection of an EV to the supply network using a cable assembly that is detachable at both ends from the EV.

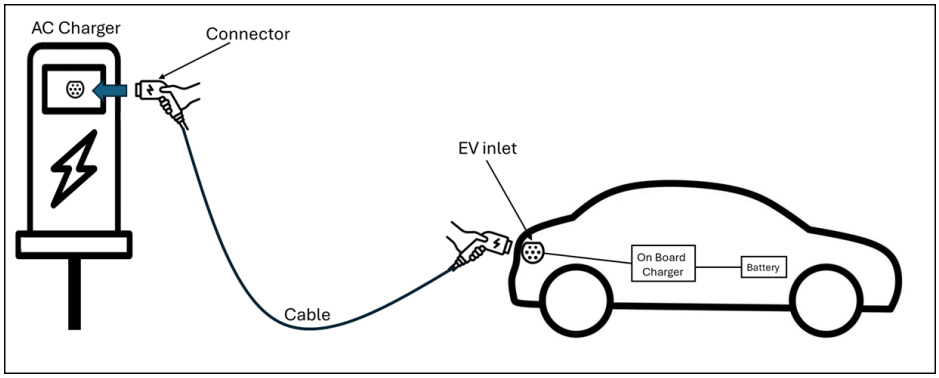

Figure 5-3 - Mode 3 (Case B Connection)

5.3.8 Figure 5-4 illustrates a Mode 3 (Case C) connection, where an EV is connected to the supply network using a cable and connector that are permanently attached to the EV charging station.

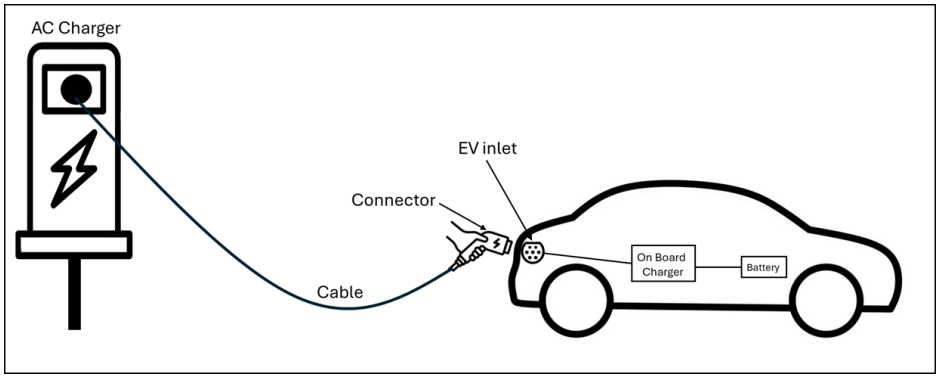

Figure 5-4 - Mode 3 (Case C Connection)

5.4 Mode 4 - DC Fast Charging

5.4.1 Mode 4 charging is a method of connecting an EV to a DC supply network using DC EV supply equipment, with a control pilot function that extends from the charger to the EV.

5.4.2 This Mode uses an off-board charger to deliver DC power directly to the EV battery, bypassing the on-board charger thus allowing significantly faster charging.

5.4.3 Figure 5-5 illustrates a Mode 4 connection to an EV, where an off-board charger delivers DC power directly to the EV battery, bypassing the on-board charger.

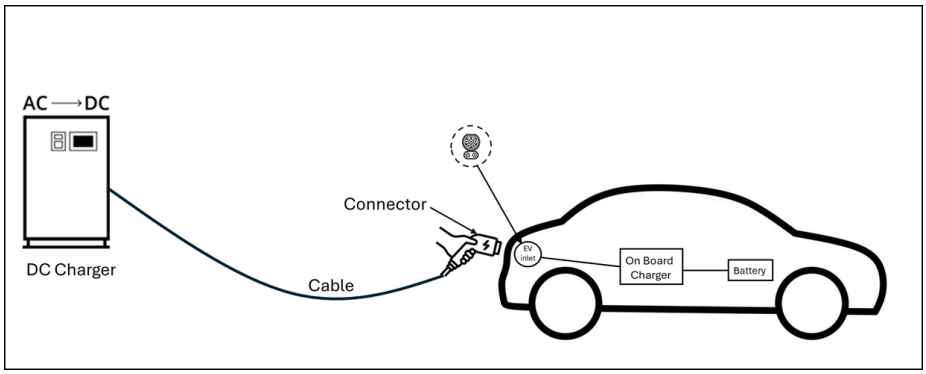

Figure 5-5 - Mode 4 (DC Fast Charging)

6 VEHICLE INLET, CONNECTOR, PLUG AND SOCKET-OUTLET

6.1 Dimensions

6.1.1 Vehicle connector, vehicle inlet, vehicle coupler, plug and socket-outlet, latching and retaining means and other accessories of the basic interface shall comply with the relevant IEC 62196-2 as specified below.

6.1.1.1 Configuration Type 1 - Vehicle couplers not exceeding 250 V, 32 A.

6.1.1.2 Configuration Type 2 - Vehicle couplers not exceeding 480 V, 63 A.

6.2 Charger Connector

6.2.1 For Mode 2 and 3, the permissible connector is Type 2 operating in alternating current (AC).

6.2.2 Whereas for Mode 4, the permissible connector is Combo CCS Type 2 and CHAdeMO operating in direct current (DC).

6.3 Socket Outlet and Plug

6.3.1 For Mode 2 charging, the installation of socket outlet and the associated plug used shall complied to the specifications outlined in IEC 60309.

6.3.2 For Mode 3 and Mode 4 charging, charging cables, connectors, and associated EVSE components shall comply with the technical specifications.

6.3.3 EVSE or any associated socket outlet shall be installed at a minimum height of 1.2 metres above finished floor level for accessibility. Installation height adjustments may be made where site conditions require.

7 ELECTRICAL PROTECTION

7.1 Protective Devices

7.1.1 The final circuit shall be provided with adequate protection against earth leakage, overload and over current conditions. EV charging equipment shall be designed, selected and installed having regard to the maximum expected ambient temperature and environmental conditions of the installation location, and shall incorporate suitable thermal protection mechanisms to prevent unsafe operation due to excessive temperature.

7.1.1.1 Rationale: This requirement takes into account Brunei Darussalam's high ambient temperatures and humidity, which may increase the risk of overheating and degradation of electrical components risks.

7.1.2 Each final circuit need to be individually protected by a protective device:

7.1.2.1 Overcurrent protective device such a Miniature Circuit Breaker or

7.1.2.2 Moulded Case Circuit Breaker or

7.1.2.3 Fuse of suitable type and rating; and **Table 7-1** indicates the Rating Current Device below.

Table 7-1: Rating Current Device

CIRCUIT	TYPE
Less than I00 Amps	Residual operating current not exceeding 30mA shall be installed using Type A or B: Residual current circuit breaker or Residual current circuit breaker with integral over-current protection
I00 Amps or more	Earth Leakage Relay; or Earth Fault Relay; and Over Current Relay

7.1.3 For Mode 2, a suitable current breaking device (i.e. socket outlet or similar device) shall be provided at the charging point for switching on after plugging and switching off before unplugging the charging cable assembly.

7.1.4 For Mode 3 and 4, EVSE communication medium device to display the activity of switching on and switching off.

7.1.5 The circuit need to be protected from reverse power flow from EV batteries in the event of power outage to the installation. EVCS need to be equipped with reverse power flow protection and anti-islanding feature in the charger system unless the EV charger is designed to only allow unidirectional power flow for battery charging.

7.2 Ingress Protection

7.2.1 The EVCS enclosures shall have a minimum IP rating in accordance with IEC 60529 to ensure protection against the ingress of solid foreign objects and water, suitable for the installation location (e.g., higher IP rating for outdoor, exposed locations) as follows:

7.2.1.1 indoor use: EVCS enclosures shall have a minimum IP rating of at least IP41; and

7.2.1.2 outdoor use: EVCS enclosures shall have a minimum IP rating of at least IP54.

7.2.2 The minimum IP degree for socket-outlet and the vehicle connectors shall be in accordance with their appropriate standards.

7.2.3 IPX4 may be obtained by the combination of the socket-outlet or connector and the lid or cap, EV supply equipment enclosure or EV enclosure.

7.2.4 IEC 60529 does not mandate a specific IP rating (e.g. IP44) for outdoor EV charging station enclosures. However, the Electrical Installation Requirements issued by the Department of Electrical Services (DES) specify a minimum IP rating of IP54 for most outdoor electrical equipment.

7.2.5 In view of this and considering that some EV chargers may be installed outdoors without additional protection against dust and rain (e.g. no

canopy or shelter), it is recommended that a minimum enclosure rating of IP54 be specified for outdoor EV charging installations.

7.3 Dedicated Circuit

7.3.1 Every EVSE or socket outlet for EV charging shall be supplied by a dedicated final circuit.

7.3.2 The electric cable for the dedicated final circuit shall be protected by means of metal sheath or armoured or installed in steel/PVC conduits.

7.3.3 Surface type electrical wiring shall be protected through trunking or cable tray use PVC/PVC or XLPE/PVC cable type.

7.3.4 The conductor size of the cable for each dedicated final circuit shall be selected based on the design of the EVSE requirement with references to IEC 60364-5-52.

7.3.5 Cables used in dedicated final circuits shall be of continuous length without any joint.

7.4 Emergency Switching

7.4.1 A means of emergency switching shall be installed to isolate the power supply to the EV charging station in the event of an electrical accident or fire.

7.4.2 The emergency switching device shall be designed with a means to prevent unintentional operation and shall be suitable for outdoor use.

7.4.3 Emergency Stop (e-stop) button is recommended for Modes 3 & 4 EV chargers with reference to IEC 60947-5-5.

7.4.3.1 Rationale - Emergency stop buttons are typically provided on DC fast charging equipment due to higher power levels and public access. AC EV chargers generally rely on automatic disconnection and fault protection and do not normally incorporate a dedicated emergency stop button.

7.4.4 Emergency switching and emergency stop functions shall not replace automatic protective functions required by the charging system.

7.5 Mandatory Function in Modes 2,3 and 4

The following control pilot functions shall be provided by the EV supply equipment:

7.5.1 Continuous monitoring and verification of the continuity of the protective earth conductor.

7.5.1.1 The function of PE or earthing is to protect from electrical shock, ensure correct operation of protective devices, protect equipment and components thus it is important to check on the PE continuity.

7.5.2 Verification that the EV is properly connected to the EV supply equipment accordingly. This to ensure power only flows when a secure and safe connection is established.

7.5.3 Verification of the correct protocol before energisation of the power supply system to the vehicle.

7.5.3.1 Energisation of the system shall not be performed until the control pilot function between EV supply equipment and EV has been established correctly with signal states allowing energisation.

7.5.4 Immediate de-energisation of the power supply system to the vehicle. (If the control pilot signal is interrupted the power supply to the EV shall be interrupted but the control pilot signalling may remain in operation. This function ensures that the high-voltage supply is cut off immediately whenever safety or operational conditions are no longer met.)

7.5.5 Provide a means to communicate to EV on the maximum allowable current.

7.5.5.1 The value of the maximum current permitted shall be transmitted and shall not exceed any of the following:

7.5.5.1.1 Rated output current capacity of the EV supply equipment.

7.5.5.1.2 Rated current capacity of the charging cable assembly.

7.5.5.2 The EV supply equipment may {automatically} interrupt the energy supply if the current drawn by the EV exceeds the transmitted value.

7.5.6 EV charging installations shall be inspected, tested, and verified by a competent person before being placed into service, for the purpose of confirming compliance with applicable safety, technical, operational, and regulatory requirements.

8 MISCELLANEOUS

8.1 Fire Safety and Risk Assessment

8.1.1 EV charging equipment shall be connected to an effective earthing system suitable for the installation environment and applicable supply arrangement, so as to ensure electrical safety and the proper operation of protective measures.

8.1.2 Protective equipotential bonding shall be provided, where needed, to minimise the risk of electric shock arising from touch voltage and to ensure fault current operation of protective devices.

8.2 Maintenance Schedules and Record

8.2.1 All parts of the electrical installation and associated equipment of the EVCS are to be properly maintained in a safe, serviceable and reliable working condition and fit for its protection purpose while delivering the services required in a secure and reliable manner.

8.2.2 Comprehensive records of the design, construction, operation, inspection, testing and maintenance of the electrical installation of the EVCS are to be properly kept, periodically updated and be accessible to relevant and authorised persons where required.

8.3 Regular Inspection and Testing

8.3.1 Regular inspection of the EVCS need to be carried out based on the manual operation recommended by manufacturer or any applicable statutory or technical requirements.

8.3.2 Regular functional testing of the protective devices, connectors, and communication systems shall be performed to ensure continued safe, secure and reliable operation.

8.3.3 All EV charging installations shall be inspected, tested, and verified by a competent person before being placed into service to confirm compliance with applicable safety, technical, and operational requirements.

8.3.4 All electrical wiring work needs to be carried out by the respective competent person.

8.4 Installation site Requirement

The location, layout and surrounding environment of the EVCS installation shall comply with the following safety, operational and accessibility criteria:

8.4.1 Vehicle Impact Protection

8.4.1.1 EVSEs installed within parking areas, shall be protected from physical damage caused by vehicles.

8.4.1.2 Appropriate measures, such as bollards or barriers, shall be installed to protect the EVCS equipment from vehicular damage.

8.4.2 Clearance and Accessibility

8.4.2.1 Sufficient space shall be maintained around the EVSE to allow for safe connection, disconnection, and emergency access.

8.4.2.2 Charging bay designs shall consider accessibility requirements, including adequate space for manoeuvring and clear signage.

8.4.3 Signage and Marking

Clear and conspicuous signage shall be provided for the EVCS location indicating the following:

8.4.3.1 Charging bay designation (e.g., "EV Charging Only").

8.4.3.2 Emergency Stop location and instructions.

8.4.3.3 Hazard warnings.

8.4.3.4 Public EVCS shall display 24-hour emergency contact number of operator.

8.4.4 Emergency Provisions

8.4.4.1 A readily accessible Emergency Stop Button shall be installed to de-energize the charging equipment and its associated supply circuit.

8.4.4.2 This is particularly crucial for DC Fast Chargers.

8.4.4.3 The installation site should provide appropriate Fire Suppression equipment (e.g., fire extinguisher) suitable for electrical and vehicle fires. CO2 and Dry powder (Classes A, B or C) are recommended for live electrical equipment.

8.4.5 Ventilation (Indoor/Enclosed Sites)

8.4.5.1 For EVCS installed in enclosed parking garages or buildings, the installer shall confirm adequate ventilation is available to prevent the accumulation of hazardous gases, particularly for charging systems that support vehicles capable of passive cell venting.

8.4.6 Site Recommendation

8.4.6.1 It shall NOT be installed flood prone areas.

8.4.7 Grid Requirements

8.4.7.1 Not applicable.

8.4.8 Earthing Requirements

8.4.8.1 EV charging station installation shall adopt the same earthing arrangement as the TN-S or TT supply system depending on the existing earthing arrangement at the location.

Rationale: TN-S (and TT for some domestic installations) earthing systems provide reliable fault protection, ensure compatibility with transformer-less inverters and RCDs, and minimize risks from DC leakage and PEN conductor faults.

8.4.8.2 In a TN-S/TT earthing system, when the fault current exceeds a set threshold, the inverter shall automatically isolate and shut down to prevent fire hazards or further damage to the system.

8.4.9 Environmental Factors

8.4.9.1 While EVs are generally designed to withstand varying weather conditions, certain environmental factors may adversely affect charging hardware and efficiency.

8.4.9.2 Corrosion Prevention - In coastal or high-humidity areas, prolonged exposure to salt and moisture can lead to oxidation in the charging port and associated electrical components, increasing electrical resistance and slowing charge speeds. Regularly inspect for rust and use a soft, dry cloth to keep the port clean.

8.4.9.3 Manage Humidity - High relative humidity (above 70%) can slow down the charging process by affecting internal chemical reactions, sometimes increasing total charging time by up to 23%. If possible, charge in a climate-controlled or dry garage during muggy seasons.