NSW Government Electric Vehicle Fleet Charging Infrastructure Prequalification Scheme

# **EVSE Specification**

Specifications A1 – EVSE Goods

Provision of the Design and/or Supply the EV chargers, load management controller, equipment and associated hardware in compliant with the requirements stipulated as below.

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| **Charger specifications** | **Requirements** |
| Output (AC) | From 7kW to 22kW, IP/32A or 3P/32A  \*single or dual ports |
| Socket type (AC) | Type 2 (IEC 62196-2) 1P/32A or 3P/32A |
| Output (DC) | 25kW to 150kW  \*single or dual ports |
| Socket type (DC) | IEC62196-3 Configuration FF Combo CCS2  (IEC 62196-3 Configuration AA CHAdeMO, if required for any existing EVs) |
| Minimum cable length | Able to reach all sides of a vehicle in the identified parking bay |
| Storage | Storage / security for tethered leads |
| Metering | NMI pattern-approved meter for an EVSE |
| Cable type | Universal to support type 2 cables, vehicle neutral |
| Data communication to Charging Management Platform (CMP) | 4G, WiFi or ethernet connection depending on the installation site |
| **General characteristics** | **Requirements** |
| Physical Impact Resistance | IK09 (minimum) |
| Ingress Protection | IP54 (minimum) |
| Operating humidity | 80% relative humidity (maximum) |
| Operating temperature | -5 to 50 degrees Celsius ambient |
| **Electric Standards** | **Requirements** |
| AC charging | IEC61851-1 mode 3 compliant |
| AC charger connection | IEC62196 –2 type 2 |
| DC charging | IEC61851-1 mode 4 compliant |
| DC charging and digital communication system | IEC61851-23 to 25 mode 4 compliant |
| EMC requirements for off board electric vehicle charging systems | IEC 61851-21-2 |
| Electromagnetic radiation compliance of electrical equipment | Compliance to the Australian Communications & Media Authority (ACMA) as a supplier of an electrical product |
| 4G, Wi-fi, RFID radiocommunication compliance | Compliance to the Australian Communications & Media Authority (ACMA) as a supplier of an electrical product |
| Labelling | Regulatory Compliance Mark |
| **Communications & Security Standards** | **Requirements** |
|  | OCPP1.6J compliant (and able to be updated to newer version) |
|  | ISO15118 compliant (Vehicle-to-Grid future capability) |
|  | Payment Card Industry Data Security Standards (if requested) |
| **Functionality** | **Requirements** |
|  | TOU (Time of Use) tariff windows |
|  | Allow Charging Management Platform (CMP) function to initiate and control charge. |
|  | Support load management functions from load management controller |
|  | Retrieval of log monitoring information for diagnostic and maintenance scheduling purposes |
|  | OTA (over the air) software updates |
|  | Support firmware updates throughout the life of the equipment, including security updates |
|  | Support reasonable through life upgrades to the hardware as appropriate should new standards and regulations require |
|  | PEN (Pot. Earth Neutral) fault detection & protection (earth continuity monitoring) |
| **Communications/access** | **Requirements** |
| User interface | Screen and/or indication lights on the charger to indicate charging status for each charge point |
| User authentication | Secured accessibility via App or RFID |
| Real time connectivity | Wi-fi / Ethernet / 4G (recommended) |
| Security | HTTPS and secure authentication methods over the transport layer (e.g. SSL and token authentication) |
| **Warranty** | **Requirements** |
|  | Compliant to the Service Level Agreement (SLA) |
|  | 5-year for ESVE materials and workmanship, including cables and connectors |
|  | EV charger hardware and related equipment rated for a min of 10,000 mating cycles from coupling to uncoupling |
| **Supply** | **Requirements** |
| Procurement | Procurement time < 3 months |
| **Load management controller – 3 phase (dynamically managed sites)** | **Requirements** |
|  | Load curtailment, fixed maximum output of all chargers per site on a time scale basis and dynamic output based on site load options |
|  | Input of energy measurement via energy meter or current transformers (CTs) over 3 phases |
|  | Control and management of up to 100 charge ports or more, for the highest specification controller |
|  | Communications to EVSE and Charging Management Platform (CMP) via OCPP 1.6J |
|  | Local connection to EVSE for communications |
|  | Web server communication to CMP via internet connection |
| **Portable charger specifications** | **Requirements** |
| Output (AC) | From 2.2kW to 22kW, 1P/10A, 1P/16A, or 3P/32A |
| Vehicle side plug type (AC) | Type 2 (IEC 62196-2) |
| Output (DC) | 20kW to 40kW |
| Vehicle side plug types (DC) | IEC62196-3 Configuration FF Combo CCS2  (IEC 62196-3 Configuration AA CHAdeMO, if required for any existing EVs) |
| Infrastructure side plug input (AC) | Single-phase 220V-240V, 10A-32A Three-phase 380V-430V, 16A-63A |
| Infrastructure side plug input types | Single-phase 10A: AS/NZS 3112 (Australian domestic standard) Single-phase 16A/32A: IEC 60309 3-pin (L+PE+N) or 5-pin (3P+PE+N) Three-phase 16A/32A/63A: IEC 60309 5-pin (3P+PE+N) |
| Ingress protection | IP55 |
| Electrical safety | Built-in Residual Circuit Devices (RCD) |
|  | Overcurrent/surge current protection |
|  | Over/under voltage protection |
|  | Short circuit protection |
| User interface | LCD screen or LED indication lights |
| EV cable length | 5m or longer |
| Data communication to Charging Management Platform (CMP) | Optional |

Specifications A2 – EVSE Works

Provision of the Design and/or Supply the EVSE installation works, site construction works and associated materials in complaint with the requirements stipulated as below. All applicable standards listed in EVSE Goods section (A1) apply.

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| **Accessibility compliance** | **Requirements** |
|  | Disability Discrimination Act |
| **Work Safety Compliance** | **Requirements** |
|  | Work Health and Safety Act |
| **Electrical Standard Compliance** | **Requirements** |
| Electrical safety | AS/NZS 3820:2020 |
| Wiring rules | AS/NZS 3000:2018 |
| Installation of cables | AS/NZS 3008 |
| Electrical installation | Local DNSP rules |
| Labelling of materials | Regulatory Compliance Mark |
| Low-voltage switchgear and control gear assemblies | IEC TS 61439-7 |
| Circuit-breakers for overcurrent protection | AS/NZS 60898.1 |
| Residual current operated circuit-breakers with integral overcurrent protection | AS/NZS 61009.1 |
| Information technology equipment – safety | AS 60950 |
| Safety of Power Transformers, Power Supplies, Reactors and Similar Products | AS 61558 |
| Electricity metering equipment (AC) – General requirements, tests and test conditions | AS 62052 |
| Electricity metering equipment (AC) – Particular requirements | AS 62053 |
| **Charger circuit design** | **Requirements** |
|  | Each EVSE must have its own dedicated circuit run directly to the switchboard with individual circuit breakers (RCD) |
|  | Isolating switch to be provided for the final sub circuit adjacent to each EVSE |
|  | NMI pattern approved meter per site, allowing for total energy validated to total EVSEs consumption |
|  | Support and conform to CMP control function requirements via OCPP1.6J |
| **Physical design** | **Requirements** |
|  | Wall, pole or pedestal mounted as per manufacturer specifications |
|  | Wheel stops or bollards for each charger to prevent accidental car damage, covering all directions a vehicle may damage the EVSE. Each EV parking spot marked in individual bay |
|  | Cable ingress, footing and mounting installed as per manufacturer specifications |
|  | EVSE shade protection required if exposed to direct sunlight (if necessary) |
| **Service warranty** | **Requirements** |
|  | Compliant with the Service Level Agreement (SLA) |
|  | 5-year installation workmanship warranty |
|  | Price list of parts, hourly rate, serviceable location in NSW |
|  | Helpdesk support during standard business hours to report any warranty / maintenance issues |
| **Site inspection services** | **Requirements** |
|  | Must be conducted by licensed/registered electrician  (https://www.fairtrading.nsw.gov.au/trades-and-businesses/licensing-and-qualifications/electrical) |
|  | To ensure compliance to all applicable standards and safe and correct operation of the EVSE installation |
|  | Identification of source of grid power supply with relevant DNSP, type of supply (three phase, single phase) |
|  | Check for 4G/3G reception and possible local network gateway/router location |
|  | Impact on site accessibility, spatial considerations |
|  | Assess existing electrical infrastructure, point of connection and interface with EVSE. Determine site and submain electrical capacity and calculate maximum demand when chargers are fully utilised (per AS3000 demand). Determine load management approach as appropriate |
|  | Capacity of switch/distribution boards, factor in additional space for future expansion |
|  | Discuss with system administration of IT network requirements of integration of EVSE into local network and Building Management System (BMS) if required |
|  | Routing of conduits, cable tray and cable runs |
|  | Assess possible penetrations through fire rated separations |
|  | Assess transformer location and size |
|  | Quote on cost of backbone electrical infrastructure upgrade and installation (if any) |
| **Installation checklist** | **Requirements** |
|  | Must be conducted by licensed/registered electrician  (https://www.fairtrading.nsw.gov.au/trades-and-businesses/licensing-and-qualifications/electrical) |
|  | Prior to commencing construction/installation, deliver an installation plan including information of site structural assessment report, risk assessment report, EVSE locations, wiring and connection diagrams, bill of materials plan, cable list, IT network routing, map exclusion zones during construction, traffic diversion/management plan, WHS plan |
|  | During installation, conduct regular meetings with agency and Building Management System (BMS) to update the installation progress, things need attentions, risk controls and register. |
|  | Current Transformer’s (CT) reading available load correctly |
|  | CT accuracy validated, test with calibration equipment or certification |
|  | Validate total energy to total charger consumption via installed NMI approved meter installed onsite |
|  | Load management system is working correctly if used |
|  | All (Residual Current Devices (RCD) using a purpose-built RCD tester to verify the performance |
|  | EVSE can operate up to maximum power |
|  | Correct polarity in terminations |
|  | Updated site drawings and Single Line Diagrams (SLD) |
|  | Upon installation completion, conduct EVSE commissioning, test report with completed work checklist |
|  | Upon installation completion, provide an installation report including photos of finished work, EVSE mounting, EVSE physical protection barriers, EVSE serial numbers, site Main Switchboard, EVSE supply Distribution Board, EVSE supply circuit breakers inside trenches, cable runs before closure, successful CMP communication connection, successful EVSE charge test result |
|  | Upon installation completion, submit a Certificate of Compliance for electrical work (CCEW) under the Gas and Electricity (Consumer Safety) Act 2017 and Gas and Electricity (Consumer Safety) Regulation 2018 |
|  | Warranties and certifications (products and workmanship) |
|  | Checklist of tests as per manufacturers documentation, charge an EV |
|  | Supply a manufacturer’s Declaration of Conformity and test certificates confirming adherence to standards in the case of all EV Chargers and associated hardware |
|  | Provide final SLDs upon installation completed |
|  | Provide ‘as built’ drawings for the installation, and installation and operation manuals for any associated equipment, spare parts list |
|  | Provide fire sealing certificates |
| **Site backbone electrical infrastructure upgrade services** | **Requirements** |
|  | Must be conducted by licensed/registered electrician  (https://www.fairtrading.nsw.gov.au/trades-and-businesses/licensing-and-qualifications/electrical) |
|  | Switch/distribution board installation & upgrades |
|  | Load management controller installation with energy meter or CTs if required |
|  | Overcurrent protection from max surge current simultaneously drawn from all EVSEs |
|  | Trenching and related civil works |
|  | Installation of cable tray, conduit and cabling |
|  | Signage and marking |
|  | Installation of charger protection equipment such as bollards and wheel stops |
|  | Installation and network integration of communication equipment |
|  | Exclusion zone setup and traffic management |
| **Electrical Standard Compliance for portable charger socket installation** | **Requirements** |
| Infrastructure outlet types for portable charger connection | Single-phase 15A: AS/NZS 3112 (Australian domestic standard) Single-phase 32A: IEC 60309 3-pin (L+PE+N) or 5-pin (3P+PE+N) Three-phase 63A: IEC 60309 5-pin (3P+PE+N) |
|  | Must install with isolation switch |
| Ingress protection | IP66 |

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| **EVSE commissioning services** | **Requirements** |
|  | EVSEs are installed, tested and calibrated as per relevant standards and manufacturer’s specifications. |
|  | If site backbone electrical infrastructure is upgraded, conduct civil structural and electrical installation checks on all new equipment and wirings implemented. Ensure all building legislation rules, electrical safety, site maximum power loading, current demand limits, local DNSP regulations and requirements are met. |
|  | Provide a site-specific checklist that will cover the physical assessment of the operation of charging station with integration tests with CMP accounting for each EVSE. The checklist must be prepared, reviewed by agency prior to the first testing and commissioning service to be carried out after the EVSE installation is completed |
|  | Thorough tests and commissioning on dynamic load management controller including but not limited to various charging options, chargers load limit control, real time site load monitoring, maximum number of chargers, charging prioritisation, load balancing operations. All applicable test scenarios are required to be listed in the commissioning checklist |
|  | Installation checks including EVSEs mounting and wiring as per relevant technical specifications, wall mountings are suitably waterproofed, wiring is appropriately insulated and protected from UV/mechanical damage, all installed materials are earthed per AS/NZS 3000 |
|  | Connectivity configuration (Ethernet / Wi-Fi / 4G) for the EVSEs, network server at site(s) and the cloud services of CMP. The RFID and user APP correctly locates and identifies all individual EVSEs |
|  | Establish connectivity to the CMP and work closely with the CMP provider to ensure all interface and charging scenarios are tested and calibrated |
|  | Validating operation of measuring devices, meters and safety equipment |
|  | Low voltage (LV) installation checks including continuity of all supply cables, earthing system, insulation of all LV cables, polarity of all three-phase equipment |
|  | EVSE tests including insulation resistance, continuity of the earthing system, polarity test, correct circuit connections, charge tests against EVSE tester or EVs |
|  | Signage checks including all circuit breakers or RCDs and isolating switches are clearly labelled, all warning and carpark signage attached as per AS 3000, AS 1319. High voltage hazardous warning signages must be attached beside EVSEs |
|  | Commissioning checklist validating operation and maintenance of charger refreshed by a person onsite every 6 months. Checklist logs to be archived and retrievable online |
|  | List of passwords on comms devices setup |
|  | All mandatory electrical testing and commissioning works shall be completed by licensed electrician in accordance with AS/NZS 300:2018 rule 8.3.3 and all relevant subclauses |
| **Training** | **Requirements** |
|  | Explain and demonstrate the purpose, function, operation and maintenance of the installations |
|  | Provide operation and maintenance manuals |

Specifications A3 – EVSE Services (Maintenance Services)

Provision of maintenance services for EV chargers, load management controller, equipment and installation workmanship. All applicable standards listed in EVSE Goods section (A1) and EVSE Works section (A2) apply

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| **EVSE maintenance and associated works** | **Requirements** |
|  | Annual recommended inspection (minimum) |
|  | Service and Maintain EVSE as per manufacturer’s recommendations |
|  | Compliant with the Service Level Agreement (SLA) |
|  | Resolve maintenance requests/on-demand repairs |
|  | Resolve breakdowns in communication with CMP |
|  | Fix warranty issues |
|  | Provide tracking information of maintenance requests and warranty issues raised |
|  | Helpdesk support during standard business hours to report any warranty / maintenance issues |