



Standard

Technology

Title: **TECHNICAL REQUIREMENTS  
FOR AC AND DC ELECTRIC  
VEHICLE CHARGING STATIONS**

Unique Identifier: **559-1531138069**

Alternative Reference Number: **<n/a>**

Area of Applicability: **Engineering**

Documentation Type: **Standard**

Revision: **1**

Total Pages: **6**

Next Review Date: **October 2029**

Disclosure Classification: **Controlled  
Disclosure**

Compiled by

**B Motaung**

**Senior Advisor: IT  
Development**

Date: 24 October 2024

Functional responsibility

**P Papu**

**Senior Manager:  
Operations Enablement**

Date: 01 November 2024

Authorized by

**D Govender**

**General Manager:  
Operations Enablement**

Date:

Supported by

**N Ntsimane**

**Middle Manager:  
Fleet Support**

Date: 01-11-2024

## Content

	Page
1. Introduction .....	3
2. Supporting clauses .....	3
2.1 Scope .....	3
2.1.1 Purpose .....	3
2.1.2 Applicability .....	3
2.2 Normative/informative references .....	3
2.2.1 Normative .....	3
2.2.2 Informative .....	3
2.3 Definitions .....	4
2.4 Abbreviations .....	4
3. General requirements .....	4
3.1 Construction, safety, marking and EMC requirements .....	4
3.2 Installation environment .....	4
3.3 User interface .....	5
3.3.1 Display .....	5
3.3.2 User authentication .....	5
3.3.3 Payment system .....	5
3.4 Connectivity .....	5
3.5 Communication protocols .....	5
3.6 Metering and billing .....	5
4. Particular requirements for AC charge stations .....	5
4.1 Type .....	5
4.2 Nominal output power .....	5
4.3 Socket type .....	5
5. Particular requirements for DC charge stations .....	6
5.1 Type .....	6
5.2 Nominal output power .....	6
5.3 Cable connector type .....	6
6. Documentation .....	6
7. Authorization .....	6
8. Revisions .....	6
9. Development team .....	6

## **1. Introduction**

Electric vehicle (EV) charging stations play a critical role in enabling the provision of safe and reliable charging services and infrastructure. This document provides a set of technical requirements for AC and DC charging stations.

## **2. Supporting clauses**

### **2.1 Scope**

This document covers requirements for AC and DC electric vehicle charge stations.

#### **2.1.1 Purpose**

The purpose of this document is to define technical requirements for AC and DC electric vehicle charge stations.

#### **2.1.2 Applicability**

This document shall apply throughout Eskom Holdings Limited Divisions.

## **2.2 Normative/informative references**

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

### **2.2.1 Normative**

- [1] IEC 61851-1, Electric vehicle conductive charging system Part 1: General requirements
- [2] IEC 61851-21-2, Electric vehicle conductive charging system - Part 21-2: Electric vehicle requirements for conductive connection to an AC/DC supply - EMC requirements for off board electric vehicle charging systems.
- [3] IEC 62196-1, Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 1: General requirements.
- [4] IEC 62196-2, Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 2: Dimensional compatibility requirements for AC pin and contact-tube accessories.
- [5] IEC 62196-3, Plugs, socket-outlets, vehicle connectors and vehicle inlets - Conductive charging of electric vehicles - Part 3: Dimensional compatibility requirements for DC and AC/DC pin and contact-tube vehicle couplers.
- [6] Open Charge Point Protocol 1.6
- [7] Open Charge Point Protocol 2.x.x

### **2.2.2 Informative**

- [8] ISO 9001 Quality Management Systems.

## 2.3 Definitions

Definition	Description
Plug & Charge	Technology detailed in ISO 15118 that allows automated communication and billing processes between the electric vehicle and the charging station without any need external identification (e.g., RFID cards, Debit/credit cards or charging apps) while ensuring high IT security at the same time.
Hub & Spoke EV charging solutions	EV charging installations that are tailored to the requirements of the specific site and comprise a centralized power unit distributing power to dispensers within the charging pool or depot.

## 2.4 Abbreviations

Abbreviation	Description
AC	alternating current
COSEM	Companion Specification for Energy Metering
CPU	Centralised power unit
DC	direct current
DLMS	Device Language Message Specification
EMC	electromagnetic compatibility
EV	Electric vehicle
IT	information technology
PIN	personal identification number
RFID	radio frequency identification
LAN	local area network
OCPP	Open charge point protocol
WAN	wide area network

## 3. General requirements

The requirements defined in this clause shall apply to both AC and DC charging stations.

### 3.1 Construction, safety, marking and EMC requirements

The charging stations shall comply with IEC 61851-1 and IEC 61851-21-2 requirements.

The charging stations shall be freestanding, and Hub & Spoke charging solutions comprising a centralised power unit (CPU) dynamically distributing power to the EV parking bays at the site will optionally be considered to optimise space and reduce the EV charging station footprints.

### 3.2 Installation environment

The AC and DC charging stations shall be built for operating outdoors.

### **3.3 User interface**

#### **3.3.1 Display**

The charging stations shall have an interactive screen, displaying real-time information on the EV's charging progress including charging status, the amount of energy delivered, estimated charging time and other charging session details in English as the default language.

#### **3.3.2 User authentication**

The charging stations shall have a built-in RFID reader for user authentication. In addition, the charging stations may optionally support PIN entry or Plug & Charge (ISO 15118-2/20) authentication.

#### **3.3.3 Payment system**

The charging stations shall support integration with open payment systems such as credit or debit cards (contactless or PIN based), mobile payments and/or RFID cards.

### **3.4 Connectivity**

The charging stations shall have an Ethernet port(s) for wired connection to a LAN or WAN and a 4G/LTE modem for communication over a public cellular network. A Wi-Fi interface may optionally be included.

### **3.5 Communication protocols**

The charging stations shall support OCPP 1.6, upgradeable to OCPP 2.0.1 or 2.1 (where ISO 15118-2/20 is supported) for communication with a back-office system.

### **3.6 Metering and billing**

The charging stations shall have an integrated electricity meter capable of providing accurate electrical energy measurements for billing purposes.

The accuracy of the integrated meter shall be at least class 1 (IEC 62053-21) for AC charging stations or IEC 62053-41 for DC charging stations.

The charging stations shall be capable of logging total energy delivered, among other charging data, on a half-hourly basis and store it for at least 13 months.

The metering and billing data generated by the charging stations shall be accessible using OCPP protocol and, optionally, using DLMS/COSEM protocol.

## **4. Particular requirements for AC charge stations**

The requirements defined in this clause shall apply to AC charging stations only.

### **4.1 Type**

The AC charging stations shall be of a dual output type. It shall comprise two AC charging ports.

### **4.2 Nominal output power**

The nominal output power for AC charging stations shall be 22 kW.

### **4.3 Socket type**

Each AC charging port socket shall be of IEC 62196 Type 2.

## 5. Particular requirements for DC charge stations

The requirements defined in this clause shall apply to DC charging stations only.

### 5.1 Type

The DC charging stations shall be of a dual output type. It shall have two DC charging ports with attached charging cables.

### 5.2 Nominal output power

The nominal output power for DC charging stations shall be 60 kW to 180 kW plus. The charging stations shall be modular and scalable enable seamless future upgrades.

### 5.3 Cable connector type

Each AC charging port socket shall be of IEC 62196 CCS2 Type.

## 6. Documentation

The charging station shall be delivered with their applicable user manuals, installation guides, communication protocol manuals, and wiring diagrams.

## 7. Authorization

This document has been seen and accepted by:

Name and surname	Designation
Aletta Mashao	Senior Manager: New Business Enablement, Distribution Division
Ockert Swanepoel	Senior Advisor OH&S
Alusani Ndou	Senior Advisor Distribution Fleet
Mzodumo Mlanjeni	Fleet Distribution Technical Officer Gauteng
Avinash Ramdhin	Senior Advisor
Edison Makwarela	Senior Consultant: Metering

## 8. Revisions

Date	Rev	Compiler	Remarks
October 2024	1	Boitumelo Motaung	First issue.

## 9. Development team

The following people were involved in the development of this document:

- Boitumelo Motaung Senior Advisor: IT/OT Development, Distribution Division
- Francois van Geems Senior Advisor: Demand Side Management, RT&D Business Unit
- Shawn Papi Senior Advisor: Demand Side Management, RT&D Business Unit