Short Introduction

This document outlines recommendations for specific technical requirements for purchasing and operating Smart and Bidirectional Charging Infrastructure. With this list of requirements a minimal and harmonized set of technical Smart and Bidirectional Charging requirements is presented, which aims to create clarity for all stakeholders involved, including drivers, contractors, clients, mobility stakeholders and energy stakeholders.

In European legislation smart (re)charging is becoming a legal requirement, especially for new infrastructure. Bidirectional charging is promoted, particularly for its grid-balancing potential. Also requirements as interoperability, data exchange, and integration with renewables and buildings are stated. However at time of publication of this document, a concrete translation of above into technical requirements is missing. This document presents recommendations for these technical requirements.

The document mainly consists of a bundle of existing standards and protocols, where the current state of technology is used as a starting point. As the technology for charging infrastructure is still maturing also requirements regarding regularly updates is included. This to safeguard that newly installed charging infrastructure remains up-to-date in the coming decade. The technical requirements finally also ensure that consumers can be given a concrete perspective to actively participate in the energy market.

The technical requirements listed in this document can be anchored in and used for:

- Drafting (inter) national legislation and regulations.
- Forming (inter) national and local policy, which is implemented in the purchase and operating of charging infrastructure.
- The development of products and propositions by market parties, as a checklist for manufacturers who develop and operate Smart and Bidirectional Charging infrastructure.

The requirements in this document are a supplement or addition to the general (charging) criteria for charging infrastructure. It has been developed based on:

- Results from the SCALE project demonstrations. SCALE has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 101056874.
- Tender experiences from the Netherlands in deploying public charging infrastructure.
- Results from European Testlab for Emobility at ElaadNL
- Feedback received from a broad range of European stakeholders including Charge Point Manufacturers, Charge Point Operators, Mobility Service Providers, Distribution System Operators, Energy Suppliers, Flexibility Service Providers, EV Manufacturers, Software companies, City Authorities, Research and Knowledge institutions and Consulting companies.

The final version of this document is made available on the ElaadNL website, see

(<u>https://elaad.nl/en/requirements-smart-and-bidirectional-charging-infrastructure/</u>). When using this document, always check this website for updated versions.

This document will be shared with the EU Smart Energy Expert Group as input to assist the European Commission with the preparation of delegated - and implementing acts.

For the context of the Netherlands, this document is the successor of the smart charging requirements from the NAL published in 2021. This document is offered as input to NKL as part of updating the "Basisset AC charging infrastructure", which is scheduled by the beginning of 2025.

Generic requirements - all charge points

The following generic requirements are applicable to all charge points (public, semi-public and private, AC as well as DC) and both for Smart Charging and Bidirectional Charging.

ID	Requirement	Explanation
1	The requirements listed below are applicable for all	
	new and to be refurbished charging points.	
2	Compliance to all mentioned standards, protocols	Conformity assessment must be in line with
	and requirements needs to be proven via an	ISO/IEC 17065:2012.
	independent conformity certificate. In case this is	
	not available, compliance needs to be proven via a	For IEC standards, Accredited National
	certification program or test cases made available	Certification Bodies (NCBs) can be found at:
	by the applicable standardization organization.	https://www.iecee.org/members/national-
		<u>certification-bodies</u> .
		Discialmer, a reference for possible independent
		test labs are provided for information purposes
		independent test labs for each standard protocol
		and requirement mentioned
3	New official published versions of all mentioned	To secure charging points are up to date within
	standards, protocols and requirements need to be	acceptable timeframe and acceptable budget for
	implemented free of charge and complied to.	all stakeholders.
	within the following period:	
	Larger structural changes (normally indicated	Both larger structural changes and smaller
	by a shift in the first number of a version, for	incremental changes need to be to be proven via
	example from v1.0 to v2.0 or a newer edition)	an independent conformity updated conformity
	will be implemented within 18 months after	certificate.
	availability of independent test certification in	
	at least the first 5 years after the purchase of	If hardware refurbishment is necessary for
	hardware.	updates, implementation should occur after the
	 Smaller incremental changes (normally 	hardware has reached the end of its technical
	indicated by a shift in the second number of a	lifetime.
	version, for example from v1.0 to v1.1 or a	
	correction or amendments document) will be	
	implemented within 6 months after availability	
	of independent test certification in the total	
	technical lifetime of the hardware.	
4	All components of the operational charging	The detailing of the periodic field (sample) audit
	Intrastructure must demonstrably meet all	process is up to negotiation between client and
	requirements under real operating conditions, to be	contractor.
	proven by a periodic (sample) field audit process .	

Smart Charging requirements - all charge points

Requirements are applicable to all charge points (Public, Semi-public and Private) and both Smart Charging and Bidirectional Charging. Most requirements in this section are relevant for AC and DC chargers. It is mentioned if a recommendation is only applicable to AC or DC charging.

ID	Requirement	Explanation
5	All charging points, regardless of power, must be remotely controllable in near realtime .	European regulations in the field of the European internal energy market state that an end customer must be enabled to become "active" in the energy market. There is an essential role for the end customer in realizing more flexibility in the electricity system, for example through its EV.
		For a private charger, remotely controlled also refers a connection to a Customer Energy Management System.
		The method to prove compliance to this requirement is up to negotiation between client and contractor.
6	All Charging Stations, Charging Points must have access to a telecommunication module and be connected with the Backend of the Charge Point	This is essential to send and receive Smart Charging signals.
	Operator or an Energy Management System at least 98% of the time / month.	The method to prove compliance to this requirement is up to negotiation between client and contractor.
7	All Charging Stations, Charging Points must operate in compliance with at least ENCS EV-311 Security requirements from IEC 62443 for procuring EV charging stations - 2025 v1.0. ¹	The requirements in this document are based on "IEC 62443-4-1 - Secure product development lifecycle" and "IEC 62443-4-2 - Technical security requirements for IACS components".
		The requirements can be found on <u>https://encs.eu/resources/security-</u> <u>requirements/#electricvehiclecharging</u>
		To prove compliance, the manufacturer can show two IECEE certificates: one for 62443-4-1 and one for 62443-4-2 compliance related to the requirements (and guidance for implementation).
8	CPO must operate its systems in compliance with ENCS EV-211: Security requirements from IEC 62443 for EV charging infrastructure 2025 v1.0. ¹	The requirements in this document are based on "IEC 62443-3-3 - System security requirements and security levels" and "ISO 27002 - Information security, cybersecurity and privacy protection - Information security controls".
		The requirements can be found on <u>https://encs.eu/resources/security-</u> <u>requirements/#electricvehiclecharging</u>
		To prove compliance the CPO can show two certificates: one for an IECEE 62443-3-3 and one for ISO 27001.

¹ In the feedback received, a limited number of stakeholders have expressed concerns about the requirements regarding cybersecurity. However, a large group of stakeholders have expressed concerns about an inadequate level of cybersecurity in relation to Charging Infrastructure in general and Smart – and Bidirectional Charging in particular. Given the fact that Charging infrastructure is marked as a sector of High Criticality in the NIS2 Directive, in this document is chosen to include strict requirements for cybersecurity.

ID	Requirement	Explanation
9	All Charging Stations & Charging Points must	Basic standard for Charging points
	operate in compliance with at least IEC 61851-	
	1:2017	At least support modes:
		- Mode 3 (AC)
		Mode 4 (DC)
10	For DC only.	This requirement is applicable for DC only
10		
	All Charging Stations & Charging Points must	These standards specify the communication between
	operate in compliance with at least IEC 61851 -	the electric vehicle (EV) and the Charging Station or
	23:2014, ISO 15118-2:2014 and DIN SPEC 70121.	Charging Point.
	,	
		List of conformance test labs can be found on CharlN
		website, see
		https://www.charin.global/technology/charin-
		conformance-testing/
11	All Charging Stations, Charging Points, and the	The communication between charge point and
	backend of the Charge Point Operator must	backend is in conformity of the Open Charge Point
	operate in compliance with at least IEC	Protocol. Mandatory use of the highest security
	63584:2024 (OCPP 2.0.1) . ²	profile.
		At least support modules: Core, Advanced security,
		Smart charging, ISO15118 support
		List of Independent test labs can be found on Open
		Charge Alliance website, see
		https://openchargealliance.org/testing-laboratories/.
12	The backend of the Charge Point Operator must	To enable data sharing with other market parties and
	operate in compliance with at least OCPI 2.2.1 . ³	-roles.
		At least surgest as a data a Chausia Das files as a data
		At least support modules: ChargingProfiles module
		List of Indonendant tast labs can be found on
		EVPopping Foundation website .coo
		Evroaming Foundation website, see
13	The backend of the Charge Point Operator must	These standards are a recommendation for
15	operate in compliance with at least IEC 627/6-	communication between DSO and CPO to enable
	10:2018 (OpenADB 2.0) or IEC 61850	Smart Charging based on actual grid load. It is up to
	10.2018 (OpenADR 2.0) OF ILC 01850.	each DSO to decide whether to follow this
	Alternatively the Charging Stations, Charging	recommendation A contractor must contact the
	Points may also be connected to a DSO device	applicable DSO to agree on required protocol for
	which is able to receive remote signals and	communication with DSO
	control the charging power	
	control the endiging power.	For public charge points in Member State the
		Netherlands a subset of OpenADR 3.0 is agreed
		Documentation and compliance information is
		available via ElaadNL.
		List of Independent test labs can be found on
		OpenADR website, see
		https://www.openadr.org/certification-
		process#testhouses.

² In the feedback received, a limited number of stakeholders have expressed concerns about the required version for OCPP. After careful consideration in this document is chosen for version OCPP 2.0.1 as this version has been published already in 2020 and is the first and only formal IEC standard for OCPP.

³ In the feedback received, a limited number of stakeholders have expressed concerns about the required version for OCPI. After careful consideration in this document is chosen for OCPI 2.2.1 as this version has been published already in 2021 and older versions of OCPI are not supported anymore. Furthermore the choice of OCPI 2.2.1. is in line with CEN Workshop Agreement (CWA) 18090 published in April 2024.

Smart Charging requirements – private charge points only

Requirements are applicable to Private charge points only. The requirements in this section are relevant for both AC and DC chargers.

ID	Requirement	Explanation
14	All Charging Stations & Charging Points can	For communication between EVSE and Power Grid
	communicate with the meter in the Grid	Management System.
	Connection if this meter supports local connection	
	possibilities.	On European and Member State level there is no
		harmonization yet for one standard or protocol.
15	All Charging Stations & Charging Points can	For communication between EVSE and Energy
	communicate with an Energy Management System	Management System.
	(EMS) via an open protocol.	
		On European and Member State level there is no
		harmonization yet for one standard or protocol.
		Energy Management System (EMS) means a set of
		interrelated or interacting elements of a plan
		which sets an energy efficiency objective and a
		strategy to achieve that objective (Energy
		Efficiency Directive (EED) – Directive 2012/27/EU)
16	All Charging Stations, Charging Points, and the	For member state the Netherlands specifically,
	backend of the Charge Point Operator must	this refers to compliance with NTA 8043:2024,
	additionally comply with additional applicable	addressing national requirements on grid
	national technical standards and grid-integration	integration, smart charging functionality, data
	protocols regarding smart charging, dynamic load	exchange, and cybersecurity.
	management, cybersecurity, and interoperability	
	with grid operators.	Note: The requirement of IEC 63584:2024 (OCPP
		2.0.1) in this document prevails above the
		requirement of OCPP 1.6 as mentioned in NTA
		8043:2024.
17	When maximum charge speed information is	Making sure all limitations are taken into account
	received via multiple sources, the lowest value	and for safety reasons.
	prevails.	

Bidirectional Charging

Requirements are applicable to all charge points Public, Semi-public and Private. The requirements in this section are relevant for both AC and DC chargers. The requirements below are in anticipation of upcoming regulation and can be used by clients who want to lead the way to bidirectional charging.

ID	Requirement	Explanation
18	All requirements for Smart Charging are also	In this section only the additional requirements
	applicable for Bidirectional Charging.	for bidirectional charging are mentioned. All
		requirements for Smart Charging are also required
		for Bidirectional Charging.
19	At/on charge point it is clearly visible that the	So that the driver knows whether bidirectional
	charge point is suitable for bidirectional charging .	charging is possible at the charge point
20	The status indicator of the charge point provides an	So that the charge points' status is visible for
	indication when the vehicle (via the charge point)	safety reasons.
	supplies energy to the grid. This indication can be	
	clearly distinguished from the regular indicators.	
21	All Charging Stations & Charging Points must	This standard specifies the communication
	operate in compliance with at least NEN-EN-ISO	between the electric vehicle (EV) and the electric
	15118-20:2022.	vehicle supply equipment (EVSE).
	Notes in the EC managed Delevated Acts for AEID is	Comply to the complete step developed and
	Note: In the EC proposed Delegated Acts for AFIR is	comply to the complete standard and also
	refurbished public charging points and new private	DEP sonvice and improved security concept
	charging points must support ISO 15118-20	DER service and improved security concept.
		List of conformance test labs can be found on
		CharlN website see
		https://www.charin.global/technology/charin-
		conformance-testing/
22	All Charging Stations, Charging Points and the	The communication between charge point and
	backend of the Charge Point Operator must operate	backend is in conformity of the Open Charge Point
	in compliance with at least OCPP 2.1.	Protocol. Mandatory use of the highest security
		profile.
		At least support modules: core, advanced
		security, smart charging, ISO15118 support,
		Bidirectional power transfer, DER control (grid
		code support)
		List of Indonendont tost John can be found on
		Chonge Charge Alliance website, see
		https://openchargealliance.org/testing-
		laboratories/
23	All Charging Stations & Charging Points must	The system is equipped with a mechanism that
_	operate in compliance with at least NEN-EN 50549 -	automatically disconnects the charge point from
	1 (including anti-islanding and interface protection).	the grid in case of power failure (anti-islanding). It
	, ,	is allowed to use the relay for this disconnection.
		Additionally, the system shall include interface
		protection (under- and overvoltage, under- and
		overfrequency protection) as part of the broader
		grid code handling requirements.
24	All Charging Stations, Charging Points and the	For UK see Engineering Recommendation G98 and
	backend of the Charge Point Operator must operate	Engineering Recommendation G99
	in compliance with national Grid Codes.	

Annex: Legislation for Smart and Bidirectional Charging

The information below is added for information purposes only. The contractor needs to comply to all applicable EU regulations. Once new regulations are in place, charge points must comply to these new regulation within the timeframe stated by the EC.

All Charging Stations & Charging Points must operate in compliance with Directive 2022/2555, also known as **NIS2**.

The NIS2 Directive establishes a unified legal framework to uphold cybersecurity in 18 critical sectors across the EU. Charging infrastructure is marked as a sector of High Criticality. The directive mandates that each Member State adopt a national cybersecurity strategy, which includes policies for supply chain security, vulnerability management, and cybersecurity education and awareness. In Member State the Netherlands, the "Cybersecurity Act", the national translation of the NIS2, will enter into force in Q3 2025.

For more information see <u>NIS2 Directive: new rules on cybersecurity of network and information systems</u> <u>Shaping Europe's digital future</u>.

At the time of publication of this document, a procedure for amending regulations for **Network Code regarding requirements for demand connection** (recommendations made by ACER) is in progress at the EC.

At the time of publication of this document, the commission adoption procedure for amending regulations for **Measuring instruments (MID)** including EVSE (COM(2024)561 - Amendment of Directive 2014/32/EU) is in progress at the EC.

At the time of publication of this document, a procedure for amending regulations for **Network Code regarding Requirements for Generators (RfG)** is underway at the EC.