

Public Charging of Electric Vehicles
From Policy to Realization

UNIFORM STANDARDS FOR CHARGE POINTS

.....
Clear-cut guidelines



WWW.NKLNEDERLAND.NL/KENNISLOKET/STANDARDS

A publication of the Netherlands Knowledge Platform for Public Charging Infrastructure (NKL)



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INTRODUCTION

Uniform Standards for Charge Points

A practical summary of the requirements and desires regarding electric vehicle charging infrastructure.

On the basis of research carried out by a broad project group, an independent standard set of guidelines has been developed that brings together relevant requirements and desires regarding electric vehicle charging infrastructure. The project group consists of market players, network operators and municipal governments.

Practical guidelines for municipal governments

- A point of departure for future public tenders and permits
- Useful in the development of policy
- A starting point for entering into agreements and signing contracts

1. The standard set is available through NKL's online knowledge portal

The standard set of charge point agreements is a project of the Netherlands Knowledge Platform for Public Charging Infrastructure (NKL) and is part of the regional approach program. In the context of NKL, a large number of public and private stakeholders work together on the realization of affordable and future-proof public charging infrastructure. The standard set of charge point agreements is available online at www.nklnederland.nl/kennisloket/. The knowledge portal is a collaboration between the NKL and CROW, the independent knowledge organization in the fields of infrastructure, public space, and traffic and transportation.





2. What does the standard set consist of?

Charge points must meet standards and regulations such as safety protocols. All guidelines, requirements and desires were categorized and assembled in thematic agreement lists. These lists were then combined to form the standard set of charge point agreements. It is important for both users and stakeholders alike that charging infrastructure works as well as it possibly can. For this reason, we have included practical requirements in addition to the guidelines.

3. Why work with the standard set?

The agreement lists are straightforward and tie in with international standards. Municipal governments and regions that work with them are not forced to reinvent the wheel, and all information is clearly assembled together. In this manner, nothing gets overlooked in the rollout of public charging infrastructure.

4. How does the standard set work in practice?

The use of the standard set increases efficiency in public tenders for charging infrastructure. Drawing up tender documentation and other materials is simplified, and costs are reduced. The agreement lists are also easy to use for other parties, such as factories that manufacture charge points. For both these parties and other market players, the demands of the Dutch market are made clear, and they know the standards that their services must comply with.



THE STANDARD SET

Guidelines per category

1. FUNCTIONALITY
2. DESIGN
3. ENVIRONMENT AND LOCATION
4. ENGINEERING AND SAFETY
5. STANDARDS AND NORMS
6. REALIZATION AND MANAGEMENT
7. BACK OFFICES AND INTERFACES
8. SMART CHARGING AND V2X
9. SECURITY

FUNCTIONALITY

Agreements regarding the functioning of charge points, e.g. user-friendliness and availability.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Charging	64	Locking of plugs	The plug must be locked in the outlet from the moment the user logs in to the moment he or she logs out.	Existing	Required	High	
Status information	65	Status changes	The charge point conveys active status changes to the management system, which are critical to the safety and the continuity of providing high-quality charging services (such as tilt and temperature).	Existing	Required	High	
Authentication	77	Ending transaction when connection is unavailable	The authorized user should be able to terminate charging transactions locally, even when the connection to the management system is not available.	Existing	Required	High	
Availability	79	Availability of new charging session	After the user logs out, the charge point should be available for a new charging session immediately.	Existing	Required	High	
Engineering	122	The RF-ID reader needs to be replaced or upgraded for future changes.	The RF-ID reader needs to be replaced or upgraded for future changes.	Existing	Desired	Medium	
Engineering	125	Use of standards to enable combination of various charge point components	Open interface standards are used between components and systems, which guarantees interchangeability between future components and systems.	Existing	Required	High	
Engineering	139	Starting up charge point after loss of power	When the power supply to the charge point is restored after an outage, no voltage will be delivered to the plug until a new transaction is initiated. The cable does not get locked again, and the current transaction is terminated.	Existing	Desired	Medium	
Engineering	140	Initiating a charge transaction	After the user inserts a valid credit or debit card, it takes a maximum of 30 seconds for the charging to begin.	Existing	Required	Medium	

FUNCTIONALITY

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Engineering	45	Canceling a transaction	The charge point cancels the transaction if a vehicle has not been connected within a certain amount of time (ex. 120 seconds) after authentication. This is so that other users do not "accidentally" plug in during a transaction in progress.	Existing	Required	Medium	
Charging service	155	Utilization	The charge points in the Netherlands deliver certified green energy from renewable energy sources such as solar, wind and biomass.	Existing	Required	High	
Charging	10	Representing the capacity of the charge point	Maximum charging capacity is indicated on the charge point. Additionally, the current capacity (Smart Charging) can be indicated as well. Links to third parties to share this information should also be supported.	Future	Required	Medium	Part of the VAS interface, how can we use to inform the EV driver? The expected charging time requires various forms of input from the charge point and the vehicle.

DESIGN

Agreements regarding the design of charge points, e.g. construction and use of materials.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Power cord and plug	60	Type of plug connection	The charge point must be equipped with Type 2 wall sockets.	Existing	Required	High	See also ID 63
Communication	62	User-friendliness	The charge point is user-friendly and can be used without instructions (other than what is written on the charge point).	Existing	Required	High	
Communication	68	Charge point information	The following information is clearly provided on the charge point: phone number for malfunctions and other services, a unique number for each charge point and a reference to terms of service.	Existing	Required	High	Emergency number must be free and reachable 24/7. Often, business phones cannot call so-called 0900 numbers.
Communication	69	Decal placement	Placement of decals must only take place in consultation with the relevant client.	Existing	Required	High	
Space required	70	Measurements	The minimum height of the charge point above the ground is 800 mm; the maximum height is 1,500 mm. Agreements must still be reached regarding the maximum space required: xx mm ² .	Existing	Required	High	Leave out space required: 30x30 is very little, especially with larger grid connections.
Appearance	59	Crash protection	Depending on the location and parking situation at the charge point, crash protection must be placed. This should take place in consultation with the relevant municipality.	Existing	Required	High	
Appearance	172	Appearance and material	The charge point is a freestanding, uniform pillar or structure.	Existing	Required	High	
Appearance	58	Appearance and material	The charge point is finished in a high-quality manner devoid of sharp edges, noticeable gaps or curvature.	Existing	Required	High	
Appearance	86	Appearance and material	The charge point has a slanted top so nothing can be placed on it.	Bestaand	Eis	Hoog	

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Appearance	88	Appearance and material	The charge point has a slanted top so nothing can be placed on it.	Bestaand	Eis	Hoog	
Appearance	61	Material	The charge point, its casing and all parts open to the air are finished in corrosion-resistant material, such as stainless steel, aluminum or high-quality impact-resistant synthetic material that is not affected by UV rays, etc.	Existing	Required	High	
Engineering	112	The maximum depth of the foundation is 600mm belowground.	The maximum depth of the foundation is 600mm belowground.	Existing	Required	Medium	Nationwide requirement
Status designation	73	Status designation	<p>The charge point must display the following statuses: Charging, Available (plugged in or card accepted), Out of service, Card refused.</p> <p>In the case of LED lights, the following colors are always used:</p> <ul style="list-style-type: none"> - Blue: Charging - Green: Card accepted, charging - Red: Out of service - Red (flashing): Card refused <p>Additional colors are possible for additional functionalities.</p>	Existing	Required	Medium	

ENVIRONMENT AND LOCATION

Agreements regarding the location of charge points, e.g. signage and wiring.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Signage	32	2 arrows in the case of 2 charge points at one location	When there are two charge points at one location, the sign should have 2 arrows.	Existing	Required	High	
Signage	34	Indications: tow warning	If applicable, the sign (or a separate sign beneath it) can include a tow warning, including text indicating for when this applies.	Existing	Required	High	OB-304 under sign
Signage	31	Standard sign	The signage must make use of the EV sign standards (such as E4-OB, E8-OB and sub-signs OB-304 and OB-504: "Charging of electric vehicles" or "Electric vehicles only"). These signs are recognized in the national Traffic and Travel Regulations (RVV). In the long term, this will be replaced with a new RVV sign.	Existing	Required	High	
Signage	144	Sign height	The sign is fastened to a finger-post with a minimum clearance of 2,200 mm or on existing objects. When placing a finger-post, service at the charging station must be taken into consideration (opening the car door and space to work).	Existing	Required		
Location	43	Sign location	The sign should be placed in a central location in relation to the parking spaces and the charge point.	Existing	Required	High	
Location	28	Distance from the EV driver	The charge point must be installed within a maximum walking distance of "X" meters (often 300 meters is the required distance) from the requested location.	Existing	Required	High	Municipal policy
Location	19	Distance from the curb	The charge point must be placed at least X cm from the curb.	Existing	Required	High	
Location	22	Avoiding becoming hindrance for other traffic	The charge point must be placed in a location that does not pose a hindrance to other traffic. The passageway to the sidewalk is at least 90 cm.	Existing	Required	High	

ENVIRONMENT AND LOCATION

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Location	24	Distance from main cable	The charge point must be placed within 25 meters of the main cable. The grid operator can charge more for locations with distances of more than 25 meters.	Existing	Required	High	
Location	21	Location of low-voltage cable: preferred side of the road	The charge point should be placed on the side of the road where the grid operator's low-voltage cable is located.	Existing	Required	High	
Location	20	Not near trees	Because of digging, the charge point should not be placed near trees.	Existing	Required	High	
Location	23	Clean soil	The charge point should be placed in a location for which it is known that there is a declaration of clean soil (often available through the soil map).	Existing	Desired	High	
Location	25	Not near other street furniture	The charge point should not be placed within x meters of other street furniture.	Existing	Desired	High	
Location	27	Not near areas with special traffic regulations	In particular within city limits, the charge point should not be placed in areas that have special traffic regulations. This is to ensure the accessibility of the charge point. A traffic order can offer a decisive answer in this situation..	Existing	Desired	High	
Location	141	Parking spaces	The parking spaces are always clearly marked.	Existing	Required	High	
Location	142	Parking spaces	The marking of parking spaces will use the same material as surrounding spaces not associated with the charge point.	Existing	Desired	High	
Municipal policy	38	Stimulating flow when leaving charge point	The CPO will confer with the relevant municipality regarding parking policy and ensuring flow of vehicles once they are charged.	Future	Desired	Medium	Policy point for municipal governments

ENGINEERING AND SAFETY

Agreements regarding the technical functioning of charge points, e.g. grounding and data connection.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Grounding	130	Each charge point is protected against overcurrent and short circuit. This protection is selective with that of the grid connection.	"The charge point communicates active status changes of errors that occur in at least the following components (more components is allowed): - RCD (earth leakage protection) - Excess current protection; - Relay; - kWh-meter; - plug lock; - RFID Reader."	Existing	Desired	High	
Grounding	131	Grounding	Depending on the electric vehicle, the charging cable and the possible Smart Charging situations, the charge capacity is normally 3.7 kW per charge point (230V AC 50Hz / 16A / 1-phase).	Existing	Required	High	
Charging	127	The charge point communicates active status changes.	Charging of electric vehicles occurs according to the Mode 3 protocol, in accordance with IEC61851.	Existing	Required	High	
Charging	42	Charge capacity	The charge point has complete control over the Mode 3 signal. Changing the PWM duty cycle and start/stop of the Mode 3 signals is possible through the firmware.	Existing	Desired	Medium	
Engineering	137	Using standardized charge protocol	Mode 3 communication is only active during an active charging transaction.	Existing	Desired	Medium	
Engineering	53	Mode 3 modulation	The charge point is ready to support master-slave setups in the future. In this scenario, one charge point performs, ensures communication to the back end and serves a number of "slaves." This is important in relation to keeping operational costs (including data costs) low. The master-slave setup is realizable for distances of up to 10 meters.	Future	Desired	Medium	
Engineering	54	Mode 3 communication activation	The charge point communicates through a mobile data connection using the Open Charge Point Protocol and back office system.	Existing	Desired	Medium	

ENGINEERING AND SAFETY

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Engineering	90	Master-slave setup	Upon losing the communication connection, the charge point actively tries to restore this, for example by resetting the modem. The charge point repeats these restoration attempts for as long as the connection is down.	Future	Desired	Medium	
Engineering	95	Communication platform	The charge point hardware is suitable for secure communication over the mobile connection.	Future	Desired	Medium	Is still in development, research is being performed for security between the charge point and the back office system. At this time, APN is being used the most as HTTPS requires a lot of data traffic.
Engineering	97	Communication during loss of connection	In the event of a data connection failure between the charge point and the back office system, for whatever reason this may occur, all transaction-related events should be saved locally and sent to the back office system when the connection is restored, with the time stamp of when the event took place.	Future	Desired	Medium	
Engineering	98	Communication security	Transactions that take place during the absence of a data connection between charge point and the back office system should be checked for legality as soon as the connection is restored. Should it appear that an illegal transaction is taking place (such as with a blocked debit or credit card), charging will terminate as soon as the data communication is restored. (The transaction can remain open and the cable should be locked in place until the user logs out; after this, the transaction will be closed.)	Future	Desired	Medium	
Engineering	99	Communication history					
Engineering	101	Offline history					

ENGINEERING AND SAFETY

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Engineering	102	Date and time	In the event of a power failure or loss of communication, the charge point keeps track of the time and date for a minimum of seven days.	Future	Desired	Medium	
Engineering	103	Date and time synchronization	The charge point must synchronize the internal clock with the back office system once every 24 hours.	Future	Desired	Medium	
Engineering	105	Communication log	The logical control unit (or controller) of the charge point is capable of saving requests, processes and potential problems with the server or network in an internal log buffer. This can be consulted by the manager within 48 hours for error analysis. The log data remain saved for 28 hours, after which they are overwritten by new log data.	Future	Desired	Medium	
Engineering	107	Memory capacity	The internal memory of the charge point must be sufficient in all situations. The memory cannot become full and/or disturb the proper functioning of the charge point.	Future	Desired	Medium	Is linked to an SLA service agreement with regard to the uptime of the charge point.
Engineering	108	Grid connection specs	The grid connection in the charge point meets the requirements put forth by the grid operator. These can be found on the ElaadNL website.	Existing	Required	Medium	
Engineering	176	RJ45 backing communication	In addition to mobile communication, the charge point also boasts an RJ45 Ethernet connection, which can also be used for communication with the back office.	Future	Desired	Medium	To facilitate maintenance locally.
Engineering	177	Communication of log parameter	The internal log buffer of the controller of the charge point is capable of logging the buildup progression and the winding down of communication with the back office system on various levels: status of the radio connection and signal strength (RSSI values), the status of the data connection (pdp context), the status of the connection (IP connection), the status of the session (http soap) and the status of the transaction.	Future	Desired	Medium	Used to see why a charge point is offline.

ENGINEERING AND SAFETY

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Accessibility	110	Charge point accessibility	A charge point must offer the possibility of access to 2 parties.				
Safety	52	PWM coordination	The charge point never gives a PWM duty cycle that implies a higher charge current than the maximum charge current permitted by general safety, the grid connection and the charge cable being used.				
Safety	128	Every charge point is equipped with an individual 4-pole 30mA earth leakage protection of at least Type A, which only turns off the live parts of the relevant charge point in the case of undesired leakage currents.	The installation in the charge station must adhere to the applicable NEN1010 standards.	Existing	Required	High	
Safety	129	Within each charge point, detection and shutoff of direct current return takes place when it is greater than 6mA (not necessarily through an RCD Type B).	The installation in the charge station must adhere to the applicable NEN1010 standards.	Existing	Required	High	
Safety	46	Interruption of a transaction in the case of incorrect power consumption	The charge point measures/reads the amount of power consumed by the vehicle per phase. If the power exceeds the value as indicated by the PWM signal by more than 10%, the charge point turns the power off, or tries to adjust the consumed power using PWM modulation. The charging process can also be restarted within the same transaction.	Future	Desired	Medium	Advice: try X times to reduce power or restart charging session.
Property rights	166	Free from property rights	Charge points and systems for the benefit of charge points are free of property rights in both physical and software implementation, and are based on open standards.	Existing	Required	High	

INTERNATIONAL STANDARDS AND NORMS

Agreements regarding the standards that must be adhered to, e.g. IEC and NEN guidelines.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Norms	132	IEC 61851-1 and IEC 61851-22 Indicates the requirements for alternating current charge points with conductive connection to an electric vehicle.	See: IEC61851-1 and IEC61851- 22	Existing	Required	High	
Norms	133	IEC62196 Indicates the requirements for plugs, sockets, vehicle plugs and vehicle sockets for charging electric vehicles using a cable with alternating current to 250A and direct current to 400A.	See: IEC62196	Existing	Required	High	
Norms	134	NEN 1010 Indicates the minimum safety requirements that low voltage installations must adhere to.	See: NEN1010	Existing	Required	High	
Measurement and registration	72	Meteorology Law	Measurement and registration of energy should take place in accordance with the Meteorology Law.	Existing	Required	High	
Working safely		NEN3140		Existing	Required	High	

INTERNATIONAL STANDARDS AND NORMS

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Protocols		OCPI	OCPI is implemented to allow receipt of charge profiles from external parties.	Existing	Desired		
Protocols		OCPP	The communication protocol between the charge point and the back office is OCPP.	Existing	Required		
Protocols		OSCP	The back office supports OSCP 1.0 to be able to work with cable forecasts from the grid operator.	Existing	Desired		

REALIZATION AND MANAGEMENT

Agreements regarding connecting, maintaining and managing charge points, e.g. the delivery of charge points and dealing with outages.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Transfer	167	Transfer	The CPO is required to work at no charge starting 1 year before the end of the contract period on everything that is required for a potential transfer of charge locations and charge data.	Existing	Required	High	
Transfer	168	Availability of parts	Parts that are essential to the functioning of the charge points must be available for at least 3 years after the end of the contract period.	Existing	Required	High	
Reporting	165	Management reporting	A periodic (preferably monthly) management report is delivered in accordance with the client's format preferences.	Existing	Required	High	
Realization	115	1 operation	The grid connection and placement of the charge point(s), as well as the organization, marking and signage of the charge location, must be executed in one day (within 24 hours) and preferably in one working process. This should be arranged with the grid operator.	Existing	Required	High	
Realization	116	1 operation	IF the organization is not finished in 24 hours, the charge location may not be put into use, and a sign must be placed stating "Charge location not yet in use."	Existing	Required	High	Important that everything is set up in 1 day because of maintenance, etc. If this is not possible, a sign will have to be placed to indicate that the charge point is not yet in use.
Realization	117	Charge point connection	Connection of the charge point must be executed within the stipulated period of time and as described in the expansion and realization procedure.	Existing	Required	High	
Realization	118	Parking space design	Organization of the parking area (including signage and lineation) must be executed in consultation with the municipality, within the stipulated period of time and as described in the expansion and realization procedure.	Existing	Required	High	

REALIZATION AND MANAGEMENT

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Realization	119	Installation of charge point	Installation of the charge point must be executed within the stipulated period of time and as described in the expansion and realization procedure.	Existing	Required	High	
Realization	120	Permits	As far as realization work for the charge point is concerned (and any moving or removal that may be required), the CPO must be in possession of the needed permits and adhere to all implementation rules and guidelines that are in effect in the relevant municipality.	Existing	Required	High	
Service-Maintenance-Management	145	Maintenance	The CPO is responsible for the maintenance of the charge points with preventive and corrective management.	Existing	Required	High	
Service-Maintenance-Management	146	Availability percentage	The availability of the charge points is at least 99% per month and is transparent for the CPO.	Existing	Required	High	
Service-Maintenance-Management	147	Repair service	The CPO has a breakdown service with qualified personnel that is available 24 hours a day.	Existing	Required	High	
Service-Maintenance-Management	148	Repair service	All instances of malfunctions or irregularities must be resolved within 24 hours, with the exception of malfunctions such as those named in ID 149 and ID 150.	Existing	Required	High	
Service-Maintenance-Management	149	Repair service	Malfunctions in which a user cannot connect or disconnect his vehicle must be resolved by the CPO within 2 hours of detection or notification.	Existing	Required	High	
Service-Maintenance-Management	150	Repair service	Malfunctions that present a danger to public safety must be resolved by the CPO within two hours of detection or notification.	Existing	Required	High	

REALIZATION AND MANAGEMENT

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Service-Maintenance-Management	153	Cleaning	The charge point is free of graffiti, clean and completely in accordance with CROW-display quality level B.	Existing	Required	High	
Service-Maintenance-Management	151	Cleaning	The CPO must have the charge point cleaned within X hours of notification that graffiti or other contamination has taken place.	Existing	Required	High	
Service-Maintenance-Management	154	Management	The CPO manages the charge locations in consultation with the municipality (lineation and signage). In case of irregularities, it returns the charge location to its original state within 3 business days of detection or notification.	Existing	Desired	High	
Appearance	66	Material	The charge point and its foundation have been developed and are suited for low-maintenance placement in the outdoors during a period of at least 10 years.	Existing	Required	High	
Engineering	109	Every charge point as an individual charge point number.	Every charge point as an individual charge point number.	Existing	Required	High	
FAT & SAT	56	FAT	Before a charge point can be placed, it must successfully pass an FAT.	Existing	Required	High	
Parts	67	Parts	Parts that are essential to the functioning of the charge points must be available for at least 3 years after the end of the contract period.	Existing	Required	High	

BACK OFFICES AND INTERFACES

Agreements regarding communication between charge points and underlying systems, e.g. communication protocols and payment options.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Authentication	75	Authentication of user	Charging transactions can be initiated and ended through the management system.	Existing	Required	High	
Authentication	76	Authentication of management system	User authentication through the management system supersedes authentication through the local database.				
Engineering	92	Communication protocol	"The firmware construction for the correct data connection between the charge point and the back office system is built in accordance with the Open Charge Point Protocol. N.B. When Smart Charging is applied on the basis of external input, at least version 1.6 is required."	Future	Required	Medium	
Engineering	96	Mobile communication	Communication takes place through the closed Communication network (APN). The CPO must enter into a contract with a telecom provider him or herself.	Future	Desired	Medium	
Data	159	Availability of third parties	The CPO offers a solution by which insight can be gathered in current availability of all the various charge points. This occurs in a straightforward manner and in a universal format suitable for exchange of up-to-date data such as XML, SOAP, HTTPS and TCP/IP)	Existing	Required	High	
Data	160	Access to data	The CPO offers an open interface solution (such as OCPI) by which customers of other charge service providers can access the functionality of the charge point, for example by using an app.	Existing	Required	High	
Data	169	Delivery of data	Data can be transferred or exported to third parties, including all historical request and use information.	Existing	Required	High	
Charge service	157	Price	CPO settles charge transactions with charge service providers and card holders of the CPO for a to-be-determined maximum price.	Existing	Required	High	

BACK OFFICES AND INTERFACES

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Charge service	158	Price	Changes in the fee amount or fee structure for the charge services are possible in consultation with and after approval from the client.	Existing	Required	High	
Payment	15	Offering access through a universal card for all public charge points	The charge point accepts valid charge passes/authentication methods (app) from various providers. The CPO is expected to sign contracts with service providers, making interoperable charge infrastructure available in the process. The CPO must also make agreements with foreign providers.	Existing	Required	High	
Service-Maintenance-Management	152	Malfunction	In the event of a technical failure, the user should be able to stop a charge transaction and pull the plug by means of a telephone request.	Existing	Required	High	
Charging	41	Messaging if the charge point is out of service	The EV driver is actively informed about the status of his charge session and the status of the charge point he is connected to.	Future	Required	Medium	
Engineering	51	Diagnostics	The CPO provides the client with the ability to personally request diagnostics of the charge point or a selection of objects through the back office system.	Existing	Required	Medium	
Engineering	47	Charge point as access point for configuration	The charge point supplier provides the municipality/CPO with the ability to personally operate all relevant functions and configurations of the charge point.	Existing	Required	Medium	
Price	14	Choice of power supplier	It must be possible for the EV driver to make use of his own power supplier at the charge point (either through his card supplier/service provider), or in any case to have the choice between various providers at the charge point.	Future	Desired	Medium	
Payment	4	Paying for charging and parking	The EV driver can pay for charging and parking at the same time.				

BACK OFFICES AND INTERFACES

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Charging	3	Messaging for driver when the battery is fully charged	A message is sent to the EV driver once his battery is fully charged.	Future	Desired	High	Supported in OCPI
Price	5	Displaying actual price prior to charging	The EV driver can use an app for insight into up-to-date charging fees and the status of the charging station.	Future	Desired	High	
Payment	6	Alternate payment methods: Smartphone	To allow one-time use, for example in the case of tourists, an alternative payment option without subscription is possible, preferably through NFC.	Future	Required	High	Covered in OCPI, but how should fee fluctuations be dealt with, such as time of day?
Availability	11	Availability and pricing information	Up-to-date information about up-to-date availability and up-to-date pricing can be viewed on an app and will also be offered to third parties.	Future	Required	High	

SMART CHARGING AND V2X

Agreements regarding Smart Charging and advanced forms of use, e.g. support for charge profiles and return delivery of energy to the power grid.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Smart Charging	200	Collaboration on smart charging	CPO collaborated actively on Smart Charging initiatives	Existing	Desired		
Smart Charging	201	Supporting protocols	To make Smart Charging possible, at least the following protocols are supported: OCPI, OCPP v1.6 and OSCP. (The time of implementation is dependent on concrete use cases and will be determined with the client.)	Future	Desired		
Smart Charging	202	OSCP	To work with cable forecasts from the grid operator, the back office supports OSCP 1.0.	Existing	Desired		
Smart Charging	203	OCPI	To support the services of third parties, the latest version of OCPI is implemented in the management system (back office) of the charging stations.	Existing	Desired		
Smart Charging	205	Computing power of the controller	The controller is able to receive and send messages at the same time (full duplex / multi-threading); there are no processes going on in the controller that hinder communication with the back office.	Existing	Desired		
Smart Charging	206	Stacking charge profiles	The charging station offers support to stack at least 6 charge profiles of the same type using ChargepointMaxProfile and TxDefaultProfile.	Existing	Desired		
Smart Charging	207	periods	The charging station offers support for 20 periods per charge profile.	Existing	Desired		
Smart Charging	208	local load balancing	The charge point divides the available energy on the basis of the connected load between the two charge points. Software will be required to execute local load balancing. It is up to the subscriber to get the most out of the connection. The solution must always be at least smart enough to ensure the use of the maximum amount of available energy.	Existing	Required		

SMART CHARGING AND V2X

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
Smart Charging	209	initiating charging regardless of charge profile	If Smart Charging is active through OCPP profiles, charging will always begin within a short amount of time (such as 30 seconds). Then the charge profile will be executed, ensuring that the user knows his vehicle has been connected correctly.	Existing	Desired		
V2x	210	V2x support	The charge point supports Futureige V2x situations, in which a current runs from the car to the grid or another installation.	Future	Desired		
V2x	211	V2x registration	The meter in the charge point is equipped to register this energy with a separate counter.	Existing	Desired		
Smart Charging	212	unlocking flexibility	The CPO makes agreements with external parties to create the possibility to ensure flexibility with energy providers and PV parties. This flexibility is then translated into charge profiles. The EV driver should also profit from this flexibility. The USEF framework can be used to ensure this flexibility.	Existing	Desired		

SECURITY

Agreements regarding the information security of charge points, e.g. encryption and access control.

Sub-category	ID	Subject description	Description of agreement or value(s)	Existing / Future	Required/ Desired	Priority	Comments
	300	Security	<p>In the interest of security, the requirements that were outlined in the document "EV Charging Systems: Security Requirements" (version 1.0), as established by ENCS, have been adhered to.</p> <p>These requirements were initiated by ElaadNL and are already being implemented by some Dutch municipalities. On the basis of this, a widely supported set of cybersecurity requirements is currently being developed.</p>	Existing	Desired		

HOW WAS THE STANDARD SET ESTABLISHED?



Multidimensional interest

In practice, we understand that there are many angles involved in how public charge points are viewed. Grid operators are primarily concerned with safety and the impact on the electrical grid. Meanwhile, governments look toward the requirements of EV drivers and organization of the space. Then there are operating companies, factories and other market players who worry about efficient implementation and management. The interest of all parties is of course that charge points are safe and functional, with costs kept as low as possible, and that the level of service for the EV driver remains high.

In this context, certain norms and regulations have already been established regarding charge points that the various parties must adhere to. Examples of these are safety protocols, agreements on electric plugs and policy rules for municipal governments. In addition to existing documentation, a lot of knowledge and experience has already been acquired on establishing agreements for charging infrastructure. With this standard set, we now have a straightforward overview of all agreements concerning charge points and their immediate environs that the various parties can conform to.

A living, breathing document

Representatives from governments, grid operators and market players collaborated to put the standard set together. The painstaking agreement lists in this publication are based on permits and public tenders that have already been executed. In the process, we have taken all aspects of charging infrastructure into account. Of course there will always be exceptions and additions: in future updates, we will continue to determine which guidelines, requirements and desires should become part of the standard set of agreements. After all, this is a living, breathing document.

HOW WILL THE STANDARD SET REMAIN UP-TO-DATE?

The standard set is a living, breathing document. It is essential that steps are taken to update the guidelines in the future and ensure that they remain current. There are constant new developments in the world of electric transportation and charging infrastructure. In order to continue offering a relevant overview, we must follow these changes closely. This is why a representative group of market players will confer twice each year to evaluate and update the standard set. Input can originate from other NKL projects, new public tenders and other market developments.

OUR PARTNERS

ABB, Alfen, Allego, Alliander, BMW, Chargepoint, ElaadNL, Enexis, ENGIE, Enovates, EV-Box, EV-Consult, G32 Municipality of Alphen aan den Rijn, Municipality of Amsterdam, MR Ae, Nissan, Province of Noord-Brabant, Renault and Stedin.

INFORMATION AND CONTACT

Information on the standard set and other projects of the Netherlands Knowledge Platform for Public Charging Infrastructure is available on the NKL website: www.nklnederland.nl

Would you like to speak with us or do you have a question or suggestion? Please send us an email: info@nklnederland.nl



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STANDARD SET OF CHARGE POINT AGREEMENTS

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