



First Committee Draft (1CD)

Project: New Recommendation

Title: Electrical Vehicle Supply Equipment (EVSE)

— Part 4: Evaluation report format

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TITLE OF THE **CD** (English):

[OIML R XX-4](#)

[OIML G 22-4](#)

Electric Vehicle Supply Equipment (EVSE)

Part 4: Evaluation report format

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[To be added]

Foreword

Explanatory Notes

Meaning of symbols used in this report

base m.p.e	=	base maximum permissible error
f_{nom}	=	nominal frequency
U_{nom}	=	nominal voltage
I_{max}	=	maximum current
I_{tr}	=	transitional current
I_{min}	=	minimum current
I_{st}	=	starting current
U_{min}	=	minimum voltage
U_{max}	=	maximum voltage
U_{range}	=	voltage range from U_{min} to U_{max}
PF	=	power factor
MMQ	=	minimum measured quantity
H1	=	humidity class 1: enclosed locations where the EVSE is not subjected to condensed water, precipitation, or ice formations;
H2	=	humidity class 2: enclosed locations where the EVSE may be subjected to condensed water, to water from sources other than rain and to ice formations;
H3	=	humidity class 3: open locations with average climatic conditions.

1 Information

1.1 EVSE information

Manufacturer and type

EVSE manufacturer:	
EVSE type (model designation):	

Separate approved meter: ☐ No ☐ Yes

If Yes:

Meter manufacturer:	
Meter type (model designation):	
Approval number:	

1.2 EVSE specification

Accuracy and measurement quantities

Accuracy class: ☐ A / 2 ☐ B / 1 ☐ C / 0.5

TariffRate: ☐ No ☐ Yes, single ☐ Yes, multi-
tariff**rate**

EVSE current type: ☐ AC ☐ DC ☐ AC&DC

Electrical parameters

EVSE AC:

Nominal frequency, f_{nom} :		Hz
Nominal voltage, U_{nom} :		V
Maximum current, I_{max} :		A
Transitional current, I_{tr} :		A
Minimum current, I_{min} :		A
Starting current, I_{st} :		A
Minimum measured quantity, MMQ		kWh

EVSE DC:

Nominal input voltage, U_{nom} :		V
Nominal input frequency, f_{nom} :		Hz
Voltage output range Minimum voltage, $U_{range}U_{min}$:		V
Maximum voltage, U_{max}:		A V
Maximum current, I_{max}:		A A
Maximum current, I_{max}:		A A
Transitional current, I_{tr}:		A A
Transitional current, I_{tr}:		A A
Minimum current, I_{min}:		A A
Minimum current, I_{min}:		A A
Starting current, I_{st}:		A
Starting current, I_{st}:		A
Minimum measured quantity, MMQ		kWh

heeft opmaak toegepast: Lettertype: Niet Cursief

heeft opmaak toegepast: Lettertype: Cursief

heeft opmaak toegepast: Subscript

Tabel met opmaak

Environment

Lower specified temperature: ☐ -55 °C ☐ -40 °C ☐ -25 °C ☐ -10 °C ☐ +5 °C

Upper specified temperature: ☐ +30 °C ☐ +40 °C ☐ +55 °C ☐ +70 °C ☐ +85 °C

Humidity class: ☐ H1 ☐ H2 ☐ H3

For use: ☐ Outdoor ☐ Residential ☐ Commercial

Direction of energy flow

☐ Two-register, bidirectional

☐ Single-register, positive direction only

Hardware and software

Hardware version(s):

Software version(s):

Specified clock output frequencies:

(include units of measurement)

Remarks

2 Units and rated operating conditions

Requirements	Passed	Failed	Not applicable	Remarks
Units of measurement (OIML G-22R XX -1, 3.1)				
Valid units for active energy: Wh, kWh, MWh, GWh				
Rated operating conditions (OIML G-22R XX -1, 3.2; Table 1)				
Frequency ¹⁾				
Voltage				
Current				
Power factor ¹⁾				
Temperature				
Humidity and water				
Harmonics ¹⁾				
Ripple²⁾				
Load balance ¹⁾				
MMQ ³⁾				

¹⁾ Only applies to AC EVSE

~~²⁾ Only applies to DC EVSE~~

³⁾ If no MMQ is marked, the maximum value shall be assumed.

3 Metrological requirements

3.1 Accuracy requirements

The EVSE has been tested for accuracy requirements:

Accuracy requirements (OIML G-22R XX -1, 3.3)	Passed	Failed	Not applicable	Remarks
General (OIML G-22R XX -1, 3.3.1)				
The manufacturer shall specify the accuracy class of the EVSE to be one of A, B or C.				
The EVSE shall be designed and manufactured such that its error does not exceed the maximum permissible error for the specified class under rated operating conditions.				
The EVSE shall be designed and manufactured such that, when exposed to disturbances according to OIML G-22-1 section 3.3.5, critical faults do not occur.				
Direction of energy flow (OIML G-22R XX -1, 3.3.2)				
The polarity of energy flow shall be defined by the manufacturer's connection instructions for the EVSE.				
An EVSE shall fall into at least one of the following categories: <ul style="list-style-type: none"> two-register, bidirectional single-register, positive direction only 				
Where a manufacturer has specified that an EVSE is capable of bidirectional energy flow, the EVSE shall correctly handle both positive and negative mean energy flow and shall fulfil the requirement of this Guide for energy flow in both directions.				
Base maximum permissible errors (OIML G-22R XX -1, 3.3.3; Table 2)				
The intrinsic error shall be within the base maximum permissible error for the specified current ranges when energy is at least MMQ and				

when the EVSE is otherwise operated at reference conditions.				
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3.2 Influence factors

The EVSE has been tested for the allowed effects of influence factors:

Influence factors (OIML G-22R XX -1, 3.3.4; Table 3, Table 4)	Passed	Failed	Not applicable	Remarks
Temperature; temperature dependence				
Self-heating				
Voltage variation ¹⁾				
Frequency variation of mains ¹⁾				
Harmonics in voltage and current circuits ¹⁾				
Reversed phase sequence (AC 3-phase only)				
Conducted disturbances, low frequency; 2-150 kHz				
Continuous (DC) magnetic induction of external origin; 200 mT				
Magnetic field (AC, power frequency) of external origin; 400 A/m				
Radiated, RF, electromagnetic fields; with current				
Conducted disturbances, induced by radio frequency fields				
Operation of ancillary devices				

¹⁾ Only applies to AC EVSE

3.3 Disturbances

The EVSE has been tested for the allowed effects of disturbances:

Disturbances (OIML G-22R XX -1, 3.3.5)	Passed	Failed	Not applicable	Remarks
Electrical disturbances (OIML G-22R XX -1, 3.3.5.2; Table 5)				
Electrostatic discharges				
Fast transients				
Voltage dips				
Voltage interruptions				
Surges on AC mains power lines				
Short-time overcurrent				
Impulse voltage				
Environmental disturbances (OIML G-22R XX -1, 3.3.5.3; Table 6)				
Protection against solar radiation				
Protection against ingress of dust				
Dry heat				
Cold				
Damp heat				
Water				
Mechanical disturbances (OIML G-22R XX -1, 3.3.5.4; Table 7)				
Vibration				
Shock				

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3.4 Durability

The EVSE has been tested for durability requirements:

Durability (OIML G-22R XX -1, 3.4)	Passed	Failed	Not applicable	Remarks
The EVSE shall be designed to maintain an adequate stability of its metrological characteristics over a reverification period specified by the national authority or eight years if none is specified its intended lifetime, provided it is properly installed, maintained, and used according to the manufacturer's instructions when in the environmental conditions for which it is intended.				
The EVSE shall be designed to reduce as far as possible the effect of a defect that would lead to an inaccurate measurement result.				
The EVSE shall be designed and manufactured such that either: a) significant durability errors do not occur, or b) significant durability errors are detected and acted upon by means of a durability protection.				
The maximum allowed error shift is 0.5 base MPE. Durability shall be when tested according to the specifications provided in OIML G-22R XX-2 section 7.5.97.4.9.				

4 Functional requirements

4.1 EVSE markings

EVSE markings (OIML G-22R XX-1 , 4.24)	Marked on EVSE?		Not applicable	Remarks
a) Approval mark				
b) Approval number/identifier				
c) Manufacturer				
d) Year of manufacture				
e) Manufacturer model				
f) Serial number				
g) Voltage range ¹⁾				
h) Current range characteristics ²⁾				
i) Nominal f Frequency ³⁾				
j) Temperature range				
k) Accuracy class				
l) MMQ				
	Passed	Failed	Not applicable	Remarks
The markings are indelible, distinct, and legible from outside the EVSE.				
The serial number is affixed in a position that is not readily disassociated from the EVSE.				
Symbols or their equivalent may be used where appropriate.				

1) U_{nom} for AC, ~~output voltage range~~ U_{min} to U_{max} for DC

2) I_{sc} , I_{min} , I_p , and I_{max} for AC and DC. ~~If current characteristics in negative direction are different from those in positive direction, these shall be marked separately.~~

2)3) For AC; in case of DC: the marking shall include "DC".

4.2 Suitability for use

Metrological requirements Suitability requirements (OIML G-22R XX-1, 4.23)	Passed	Failed	Not applicable	Remarks
General requirements (OIML G-22R XX-1, 4.3.1 – 4.3.42.1)				
Accuracy shall be determined at the connection point to the vehicle.				
If applicable, an EVSE that applies corrections to compensate for energy loss cable assemblies shall comply with the requirements in OIML G-22R XX-1 section 4.3.2.1.3.				
The EVSE shall have no means to allow measured energy to be diverted between the point of measurement and the EV.				
If an EVSE is capable of receiving and measuring electrical energy from the vehicle to be transferred to the nominal source , then it shall comply with the requirements in OIML G-22R XX-1 section 4.3.42.1.5.				
Transaction requirements (OIML G-22R XX-1, 4.3.52.2)				
Ad hoc public transactions comply with the requirements in OIML G-22R XX-1 section 4.2.2.1.14.3.5.1.1.				
Contractual public transactions comply with the requirements in OIML G-22R XX-1 section 4.2.2.1.24.3.5.1.2.				
Contractual private transactions comply with the requirements in OIML G-22R XX-1 section 4.2.2.1.4.3.5.1.3.				
Legally relevant data referenced in OIML G-22R XX-1 section 4.2.2.14.3.5.1 must shall be accessible to the end user through the client interface or be made available to the end user afterwards through an external backend be stored in the EVSE and available for display to the user until it has been transmitted for settlement and an acknowledgement received.				
Means shall be provided to automatically terminate charging and complete the transaction in the event of a break in the connection with the vehicle.				
Multiple tariff rates (OIML G-22R XX-1, 4.2.33.6)				
If an EVSE can apply multiple tariffs rates during an energy transfer session it shall comply with the requirements in OIML G-22R XX-1 section 4.2.33.6.				
Multiple tariff rates shall not be applied unless the customer has agreed to variable pricing through interaction with the EVSE or a contractual agreement.				
Power outage (OIML G-22R XX-1, 4.2.43.7)				
The transaction shall be paused at the time of the supply power outage.				
Once the power is restored it shall comply with the requirements in OIML G-22R XX-1 section 4.3.72.4 point 2.				

4.3 Access to data

Describe the indicating device(s), all relevant measurement data displayed, display format, and instructions on how to use it.

Requirements for access to data (OIML G-22R XX-1 , 4.43)	Passed	Failed	Not applicable	Remarks
Readability of the result (OIML G-22R XX-1, 4.43.1)				
An EVSE shall make the legally relevant transaction data accessible to the end user through the client interface by either OIML G-22R XX-1 section 4.43.1.1 and/or OIML G-22R XX-1 section 4.43.1.2.				
Client interfaces (OIML G-22R XX-1, 4.43.2)				
Client interfaces shall be able to display all data-legally relevant for billing purposes transaction data in an easily readable form.				
Client interfaces shall display the energy being transferred, either continuously or on demand.				
Client interfaces shall provide facilities to allow any user input relevant to a transaction.				
For multi- rate tariff devices, the data for each tariff rate applied shall be displayed.				
Any decimal fractions shall be clearly indicated.				
Client interfaces shall not be significantly affected by exposure to normal operating conditions over the maximum duration of the EVSE lifetime.				
Registers (OIML G-22R XX-1, 4.43.3)				
Electronic registers shall be non-volatile so that they retain stored values upon loss of power. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and tariff rate registers for multi- tariff rate EVSE.				
Stored values shall not be overwritten and shall be capable of being retrieved upon restoration of power. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and tariff rate registers for multi- tariff rate EVSE.				
The register shall be capable of storing and displaying an amount of energy sufficient to ensure that no roll over will occur during a transaction. This applies to all registers relevant for billing including positive and negative flow registers for bidirectional EVSE and tariff rate registers for multi- tariff rate EVSE.				
In the case of electronic registers, the minimum retention time is until the transaction is finalised or cancelled.				

If electronic indicating devices have segments, then the EVSE shall be provided with a display test that switches all the display segments on then off for the purpose of determining whether all the display segments are working.				
The EVSE shall have one or more registers for the energy delivered to the electrical vehicle for a transaction, which shall be reset to zero at the beginning of a new transaction.				
The reset to zero function shall be disabled while a charging event is ongoing.				
Testability (OIML G-22R XX-1, 4.43.4)				
The EVSE shall readily provide legally relevant energy data to the evaluator with the resolution specified in OIML G-22R XX-1 section 4.43.4.1.1 or OIML G-22R XX-1 section 4.43.4.1.2 or better, where the least significant digit increments by 1, without any additional means. (OIML G-22R XX-1, 4.43.4.1)				
For ad hoc transactions the EVSE shall provide the price per unit of measurement and the total money value of the transaction. (OIML G-22R XX-1, 4.43.4.2)				
The primary mode of testing shall be based on the energy displayed on the client interface of the EVSE. (OIML G-22R XX-1, 4.43.4.3)				
Transaction data should be read directly from the client interface or from the cryptographic secured data-package of the legally relevant data, via a communication interface. (OIML G-22R XX-1, 4.43.4.3)				
If present, testing may also be performed while using a dedicated pulse output. The pulse output shall comply with the requirements in OIML G-22R XX-1 section 4.43.4.3.				

4.4 Evaluation of software controlled EVSE Requirements for software-controlled components and EVSE

Describe the software and indicate the version of the software present at the time of testing, and how to identify the software version.

Requirements for software controlled EVSE (OIML G 22R XX-1 , 4.4)	Validation Description	Passed	Failed	Not applicable
Software identification (OIML G 22R XX-1 , 4.4.325.2)				
Audit trail (OIML G 22R XX-1 , 5.34.4.4)				
Detection of significant defects (OIML R XX-1 , 5.4)				
Software Error protection (OIML G 22-1 , 4.4.53)				
Parameter protection (OIML G 22-1 , 4.4.4)				
Time stamps (OIML G 22R XX-1 , 4.4.65.5)				
Separation of electronic devices and sub-assembliesDynamic modules (OIML G 22-1 , 4.4.75)				
Separation of software partsSoftware update (OIML G 22R XX-1 , 4.4.865.6)				
Updates to legally relevant softwareRemote verification update capabilities (OIML G 22R XX-1 , 4.4.975.7)				
Checking facility event recordSoftware (OIML G 22R XX-1 , 4.4.105.88)				
Compatibility of operating system and hardware Storage of data, transmission via communication systems (OIML G 22R XX-1 , 4.4.145.99)				
Constraints for operation (OIML G 22-1 , 4.4.12)				
Parameters (OIML G 22R XX-1 , 4.4.135.10)				
MeasurementProtection of transaction data (OIML G 22R XX-1 , 4.4.145.11)				

Client and verification interface (OIML G-22R XX-1, 5.124.4.15)				
Communication interface (OIML G-22R XX-1, 4.4.165.13)				
Separation of electronic devices and components (OIML G-22R XX-1, 4.4.175.14)				
Separation of modules (OIML G-22R XX-1, 4.4.185.15)				
Storage of data (OIML G-22R XX-1, 4.4.195.16)				
Transmission of measurement data (OIML G-22R XX-1, 5.174.4.20)				

5 Type approval

5.1 Documentation type approval

Documents type approval provided (OIML G-22R XX-2, 6.5.1)	Yes	No	Not applicable	Remarks
Application for type approval				
Identification of the type				
Metrological characteristics of the EVSE				
The technical specification for the EVSE				
User manual				
Installation manual				
Description of the checking facility for critical faults				
Software documentation				
Description of the legally relevant software and how the requirements are met.				
Description of security means of the operating system				
Description of the (software) sealing method(s)				
Overview of the system hardware, e.g. topology block diagram, type of computer(s), type of network, etc.				
Where a hardware component is deemed legally relevant or where it performs legally relevant functions, this should also be identified.				
Description of the accuracy of the algorithms (e.g. filtering of A/D conversion results, price calculation, rounding algorithms, etc.)				
Description of the user interface, menus, and dialogues				
Software identification and instructions for obtaining it from an instrument in use.				
List of commands of each hardware interface of the measuring instrument / electronic device / sub-assembly including a statement of completeness.				
List of durability errors that are detected by the software and if necessary for understanding, a description of the detecting algorithms.				
Description of data sets stored or transmitted				
If fault detection is realised in the software, list of faults that are detected and a description of the detecting algorithm.				

Operating manual				
Existing type test documentation				
The application for type approval shall be accompanied by type test documents or other evidence that supports the assertion that the design and characteristics of the measuring instrument comply with the requirements of this Guide.				

5.2 Type definition

Specimens type testing (OIML G-22R XX-2 , 6.5.2.13)	Passed	Failed	Not applicable	Remarks
The manufacturer shall provide at least as many specimens of the EVSE as are required by the national authority.				
The type test shall be made on one or more specimens of the EVSE, selected by the type-test body laboratory, to establish its specific characteristics and to prove its conformity with the requirements of this Guide.				
In the case of modifications to the EVSE made after or during the type test and affecting only part of the EVSE, the issuing body authority responsible for type evaluation may deem it sufficient to perform limited tests on the characteristics that may be affected by the modifications.				