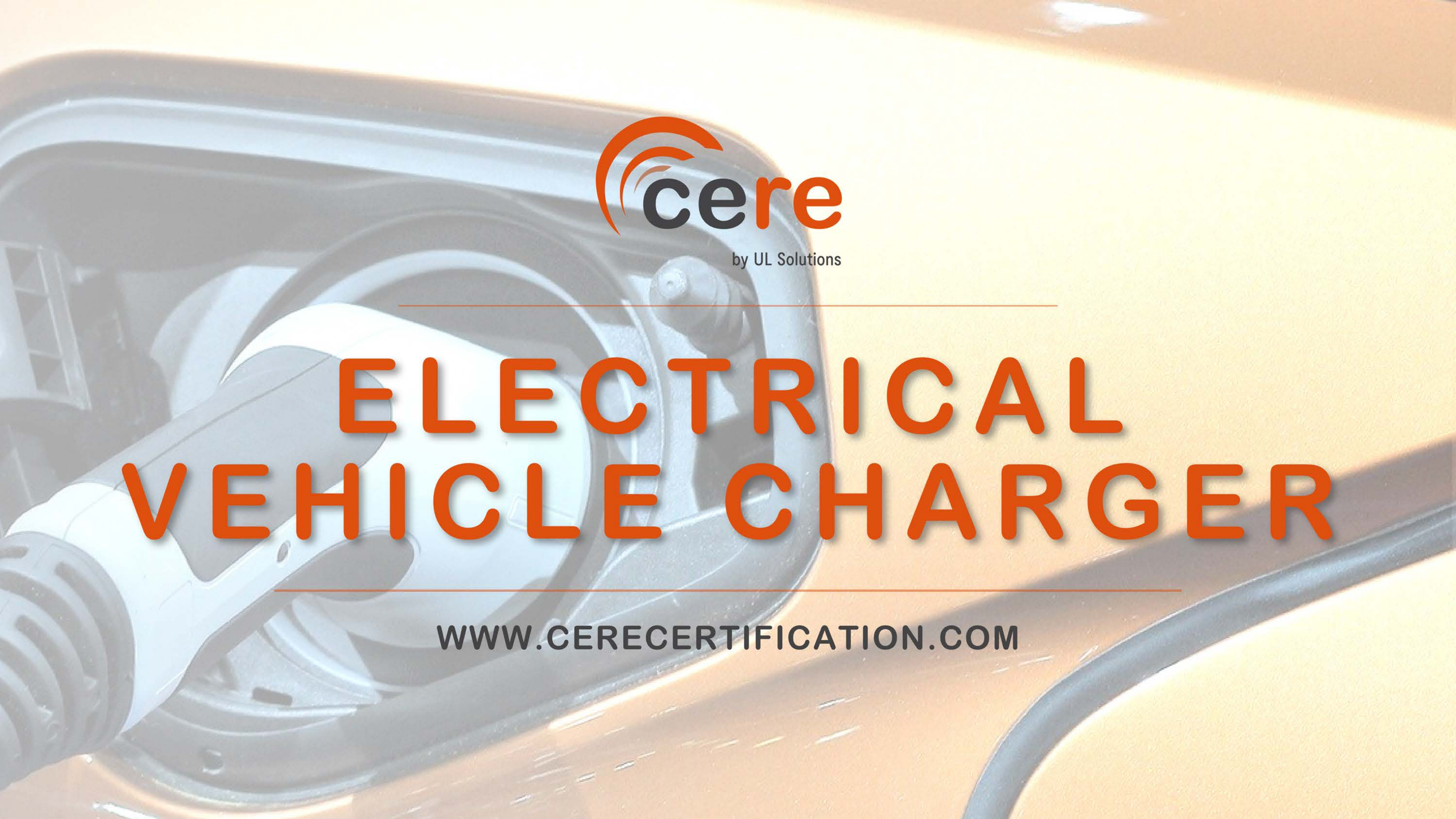

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# ELECTRICAL VEHICLE CHARGER

WWW.CERECERTIFICATION.COM

CERE, by UL Solutions is a Testing, Simulation and Certification body that was originally set up as a Certification Entity in 2015.

CERE, by UL Solutions was created in its beginnings as a Certification Entity for Renewable Energies, with the purpose of being the access key to the different countries where certification of components, full installations certificates, modeling and software validation of components and facilities was required.

Currently CERE, by UL Solutions has expanded its capabilities and is dedicated not only to Renewable Energies, but also to Electric Vehicle chargers, Industrial Machinery, Medical Devices and Electrical and Electronic Products.

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# Accreditations

We have accreditations that verify our technical competences as a Certification Body and Testing Laboratory. This fact ensures a deep knowledge of the international requirements for components and installations.

CERE, by UL Solutions is accredited by ENAC and a2la (IAF/ILAC members) as a Certification Body according to ISO 17065; and as an Accredited Testing Laboratory according to ISO 17025. We also belong to the IEC Scheme being CBTL Testing Laboratory and NCB Certification Entity.

In addition, we can provide solutions to countries such as North America, Israel, Colombia, Korea, Australia, etc.

# Our team

**Our team has a long-accumulated experience in testing, simulation and certification for all its business areas, including an in-depth knowledge of grid integration standards, design, safety, EMC and grid quality.**

**All this knowledge is applicable in renewable energy generators and controllers, electric vehicle chargers, photovoltaic trackers, household appliances, industry, industrial machinery, electrical and electronic products and medical devices, among others.**

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# What's CERE Electrical Vehicle Charger?

**CERE, by UL Solutions Electrical Vehicle Charger is a department created to cover the demand of services for electrical vehicle charger system inside of CERE (Certification Entity for Renewable Energies)**

**CERE, by UL Solutions Electrical Vehicle Charger was created to provide support and trust at any stage of certification and testing of Electrical vehicle charger systems.**

Our services include Testing and Certification according Safety standards.

This process includes testing, certification and verification of Electrical Vehicle Charger systems and their components.

The electrical laboratory has developed a section with expert technicians in this field. We have carried out tests for Spanish, Portuguese and German manufacturers, for the European and US market.

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# Applicable Standards

**CERE, by UL Solutions is accredited as Certification Body and Testing Laboratory for Electrical Vehicle Charger according the following standards:**

# USA Projects

## SAFETY,
## FOR NORTH AMERICAN MARKET

**UL 2202:2012** Standard for Electric Vehicle (EV) Charging System Equipment

**UL 2594:2016 / CSA C22.2 NO. 280 / NMX-J-677-ANCE** Electric Vehicle Supply Equipment. (Incluye requisitos para USA, CAN y México)

**UL 9741, Ed.1 23/09/2023**. Electric Vehicle Power Export Equipment (EVPE)

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# IEC Projects

## SAFETY, EMC

**IEC 61851-1:2017** Electric vehicle conductive charging system - Part 1: General requirements.

**IEC 61851-23:2014** Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station

**IEC 61851-21-2:2018** 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.

**IEC 61851-24:2014** Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging

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# IEC 61851-1:2017

This part of IEC 61851 applies to EV supply equipment for charging electric road vehicles, with a rated supply voltage up to 1 000 V AC or up to 1 500 V DC. and a rated output voltage up to 1000 V AC. or up to 1500 V DC.
Electric road vehicles (EV) cover all road vehicles, including plug-in hybrid road vehicles (PHEV), that derive all or part of their energy from on-board rechargeable energy storage systems (RESS).
This standard also applies to EV supply equipment supplied from on-site storage systems (e.g., buffer batteries).

**The aspects covered in this standard include:**

The characteristics and operating conditions of the EV supply equipment
The specification of the connection between the EV supply equipment and the EV
The requirements for electrical safety for the EV supply equipment.

**Additional requirements may apply to equipment designed for specific environments or conditions, for example:**

EV supply equipment located in hazardous areas where flammable gas or vapour and/or combustible materials, fuels or other combustible, or explosive materials are present.
EV supply equipment designed to be installed at an altitude of more than 2000 m
EV supply equipment intended to be used on board on ships

The IEC 61851 series covers all EV supply equipment except for in-cable control and protection devices for mode 2 charging of electric road vehicles (IC-CPD) which are covered by IEC 62752.

The tests are carried out by CERE, by UL Solutions Laboratory, and test can be performed either at the client's facilities or in our laboratory.

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# UL 2202

These requirements cover conductive charging system equipment intended to be supplied by a branch circuit of 600 volts or less for recharging the storage batteries in over-the-road electric vehicles (EV). The equipment includes off board and on board chargers. Off-board equipment may be considered for indoor use only or indoor/outdoor use. On board equipment is always considered outdoor use. Off board equipment is intended to be installed in accordance with the National Electrical Code, NFPA 70.

For the purposes of this standard, the term “electric vehicle”, designated throughout by the initials “EV”, is considered to cover electric vehicles, hybrid electric vehicles, and plug-in versions of these vehicles.

Electric vehicle charging system equipment that is not a complete assembly and depends upon installation in an end product for compliance with the requirements in this standard is investigated under the requirements of this standard and the standard for the end product. On board chargers that rely upon specific installation requirements within an EV for compliance with the requirements in this standard, are to be evaluated based on those installation requirements and equipment.

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# UL 2202

These requirements do not cover battery chargers covered by the Standard for Battery Chargers for Charging Engine-Starter Batteries, UL 1236, or the Standard for Industrial Battery Chargers, UL 1564.

The requirements for devices or systems intended to reduce the risk of electric shock to the user in grounded or isolated circuits for charging electric vehicles are covered in the Standard for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits; Part 1: General Requirements, UL 2231-1, and the Standard for Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits; Part 2: Particular Requirements for Protective Devices for Use in Charging Systems, UL 2231-2.

The requirements in clauses 2 – 84 apply directly to off board charging equipment. Supplement SA applies directly to on board charging equipment.

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# UL 2594:2016 / CSA C22.2 NO. 280 / NMX-J-677-ANCE

This Standard covers conductive electric vehicle (EV) supply equipment with a primary source voltage of 600 V ac or less, with a frequency of 50 or 60 Hz, and intended to provide ac power to an electric vehicle with an on-board charging unit. This Standard covers electric vehicle supply equipment intended for use where ventilation is not required.

**The following list of examples of electric vehicle supply equipment are included in this Standard:**

EV Cord Sets – Rated 125 Vac maximum, 16 A maximum, intended for indoor and outdoor use.

Fastened in place EV Charging Stations – Rated 250 Vac maximum, 40 A maximum, intended for indoor or outdoor use.

Fixed in place EV Charging Stations – Rated 600 Vac maximum, intended for indoor or indoor/outdoor use.

Fixed in place EV Power Outlet – Rated 600 Vac maximum, intended for indoor or indoor/outdoor use.

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# UL 2594:2016 / CSA C22.2 NO. 280 / NMX-J-677-ANCE

This Standard does not cover electric vehicle charging equipment. For EV charging equipment not covered by this Standard, refer to Annex A, Ref. No. 4.

For Mexico, use 127 Vac where 120 or 125 Vac is referenced in this Standard. In Canada and the United States, this does not apply.

The products covered by this Standard are intended for use in accordance with the Installation Codes in Annex A, Ref. No.1.

This Standard does not cover cord sets or power supply cords for applications other than EV charging cord sets. For cord sets and power supply cords not covered by this Standard, refer to Annex A, Ref. No. 2 and No. 3.

This Standard does not cover electric vehicle connectors. For electric vehicle connectors not covered by this Standard, refer to Annex A, Ref. No. 5

This Standard does not cover regular-use power outlets. For regular-use power outlets not covered by this Standard, refer to Annex A, Ref. No. 6.

This Standard does not cover equipment intended for wireless power transfer, which may also be designated as wireless charging, inductive charging, magnetic resonance charging, or any other similar designation indicating the transfer of power from the EVSE to the vehicle through other than a conductive connection.

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# IEC 61851-21-2:2018

This part of IEC 61851 defines the EMC requirements for any off-board components or equipment of such systems used to supply or charge electric vehicles with electric power by conductive power transfer (CPT), with a rated input voltage, according to IEC 60038:2009, up to 1 000 V AC or 1 500 V DC and an output voltage up to 1 000 V AC or 1 500 V DC.

This document covers off-board charging equipment for mode 1, mode 2, mode 3 and mode 4 charging as defined in IEC 61851-1:2017.

Cables where there is no electronic or no electric/electronic switching are considered as passive (benign) and are deemed to comply with the emission and immunity requirements of this document without any need for testing.

This document does not apply to any on-board components or equipment of charging or power supply systems being part of the vehicles. The EMC requirements for such equipment are covered by IEC 61851-21-1: 2017.

Compliance with the emission and immunity requirements of this document is verified where it can be demonstrated that the equipment under test (EUT) meets the respective limits, during type tests in the measuring arrangement of this document.

Requirements for electric vehicle wireless power transfer (WPT) systems are covered in IEC 61980 (all parts).

**The tests are carried out by CERE, by UL Solutions Laboratory**

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# IEC 61851-23:2014

**Electric vehicle conductive charging system - Part 23: DC electric vehicle charging station**

**IEC 61851-23:2014, gives the requirements for d.c. electric vehicle (EV) charging stations, for conductive connection to the vehicle, with an a.c. or d.c. input voltage up to 1 000 V a.c. and up to 1 500 V d.c. according to IEC 60038. It provides the general requirements for the control communication between a d.c. EV charging station and an EV. The requirements for digital communication between d.c. EV charging station and electric vehicle for control of d.c. charging are defined in IEC 61851-24**

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# IEC 61851-24:2014

**Electric vehicle conductive charging system - Part 24: Digital communication between a d.c. EV charging station and an electric vehicle for control of d.c. charging**

IEC 61851-24:2014, together with IEC 61851-23, applies to digital communication between a d.c. EV charging station and an electric road vehicle (EV) for control of d.c. charging, with an a.c. or d.c. input voltage up to 1 000 V a.c. and up to 1 500 V d.c. for the conductive charging procedure. The EV charging mode is mode 4, according to IEC 61851-23. Annexes A, B, and C give descriptions of digital communications for control of d.c. charging specific to d.c. EV charging systems A, B and C as defined in Part 23.

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# RESUME

CERE, by UL Solutions is accredited as Certification Body and Testing Laboratory for the electric vehicle charger solution, both nationally and internationally, being accredited for the IEC safety standard:

**IEC 61851-1:2017 - IEC 61851-23:2014 - IEC 61851-21-2: 2018**

Under IAF, ILAC and CB scheme (CBTL and NCB)

CERE, by UL Solutions is also the only entity in Spain providing a solution for the North American market thanks to its accreditation for UL standards:

**UL 2202:2012**

Standard for Electric Vehicle (EV) Charging System Equipment

**UL 2594:2016 / CSA C22.2 NO. 280 / NMX-J-677-ANCE**

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# Laboratory Capabilities

# EMC

- Full Anechoic Chamber of 3 meters and up to 6GHz both in emission and radiated immunity.
- Complete test capacity of IEC 61000 in both radiated and conducted.

# Test Benches

- ✓ Test bench up to 500kVA for converters
- ✓ 3 test benches up to 166kVA with parallel connection capacity.
- ✓ DC voltage range up to 1500V and AC voltage range up to 800V and 400Hz
- ✓ Passive loads up to 100kVA and electronic load up to 500kVA for island testing.

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# Environmental and Climate Laboratory

**TEMPERATURE RANGE FROM -40ºC TO 85ºC WITH 85%RH OR 125ºC WITHOUT HUMIDITY REFERENCE.**

- ✓ Low temperature chamber
- ✓ High temperature chamber
- ✓ Temperature chamber
- ✓ Dycometal temperature chamber
- ✓ Binder temperature chamber
- ✓ IP and Nema Camera
- ✓ Vibration table
- ✓ Saline atmospheres chamber

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# References

CERE, by UL Solutions Electrical Vehicle Charger has a wide expertise in the field of testing.

Some of the most important projects carried out recently are in Spain, Germany and Portugal.

The offered testing include:

- CB Certificate and testing according to Spanish market.
- Evaluation of communication protocol.

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# Disclaimer

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