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## Spanish Requirements for Converters

## Who we are



**CERE** was originally set up as a Certification Entity for Renewable Energies.

**CERE** was created to be the access key on the target countries for Renewable Energies, where certification of components, full installations certificates, modeling and software validation of renewable Power Plants, were required.

The company is accredited as Testing Laboratory and Certification Body.

Our services include Testing and Certification according Safety, EMC, Grid Quality, grid connection requirements, design certification and complete installations Certificates, complementary simulations, modelling validation, electromagnetic transient analysis.

This full process includes Inspection, Testing and Certification of Components such as PV modules, Wind and PV converters, trackers, transformers, string boxes, combiner boxes, etc., and the Certification for full Power Plants according particular country, DSO or TSO requirements and / or According Client Requests

# CERE Profile

The Company is managed by Miguel Martínez. Its team has a large experience in Certification for more than 10 years, including renewable energy's components and installations for worldwide grid integration, design, safety, EMC and grid quality, among others.

During the last 6 years CERE has grown exponentially, diversifying its services until the actual company structure:



- Certification
- Converters
- Grid Code & safety
- Simulation
- Trackers
- Batteries
- EMC

- Electrical Vehicle Charger
- Transformers
- Medical devices
- Electric and Electronic devices
- Quality System certification

# CERE Capabilities

**CERE's** Facilities in Getafe, Madrid, Spain have the following installations:

- Test site up to 500kVA for all kind of converters and Battery testing
- Test site up to 250kVA for all kind of converters including frequency variators up to 400Hz
- Test site up to 100kVA for DC-AC converters
- Test site up to 50kVA for all kind of converters and Battery testing. The source can act as DC source and AC source and electronic loads
- Test site up to 10kVA for single phase and three phase converters
- Passive loads up to 100kVA
- Electronic loads for Antiislanding up to 500kVA
- EMC Chamber and EMC laboratory
- Safety laboratory
- Simulation laboratory including Power Factory, PSSE and MATLAB

## What's CERE Safety Converters?



**CERE** Renewables is a department created to cover the demand of services for renewable energies components inside of CERE (Certification Entity for Renewable Energies)

**CERE** Renewables and particularly the solution for converters for the Spanish market was created to provide support and trust at any stage of certification and testing for grid connection requirements and the Client to be able to provide a self declaration CE Marking.

Our services include Testing and Certification according different standards.

This process includes testing, certification and verification of converters and their components.

The electrical laboratory has developed a section with expert technicians in this field. We have carried out tests for Safety, EMC, grid quality and Grid connection market.

# CERE's Accreditations

- **CERE** is accredited by ENAC and a2La (IAF/ILAC members) as Certification Body According ISO 17065 and Testing Laboratory according ISO 17025 for Power Generating Units. This fact ensures a deep knowledge in international requirements for components and Renewable Energies Power Plants.
- **CERE** is also CBTL and NCB for the IEC Scheme.
- MET approval for the North American market
- Sunspec approval
- SII approval for Israel
- RETIE approved certification body for PV inverters (Colombia)
- Corean Approval

CERE's Accreditation can be checked in:  
<http://www.cerecertification.com/accreditations>



## Applicable Standards

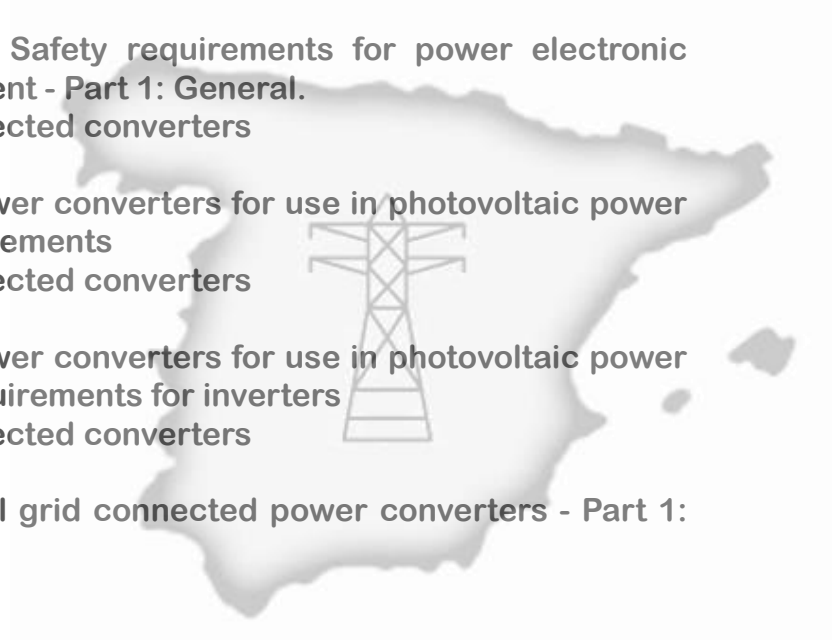
Depending on the applicability of the converter, there will be different standards to fulfill for getting the products into the different installations.

1. Safety requirements for CE Marking and CE self declaration.
2. EMC requirements for CE Marking and CE self declaration.
3. Grid Quality Standards for converters.
4. Zero-Injection grid connection requirements.
5. Distribution grid connection requirements
6. Grid connection requirements (Distribution and transmission systems)



# Applicable Standards

1. Safety Standards for converters and safety requirements for CE Marking self declaration:
  - **IEC 62477-1:2012+AMD1:2016** Safety requirements for power electronic converter systems and equipment - Part 1: General. Standalone and / or Grid connected converters
  - **IEC 62109-1:2010** Safety of power converters for use in photovoltaic power systems - Part 1: General requirements Standalone and / or Grid connected converters
  - **IEC 62109-2:2011** Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters Standalone and / or Grid connected converters
  - **IEC 62909-1:2017** Bi-directional grid connected power converters - Part 1: General requirements.





## Applicable Standards

2. EMC Standards for converters and EMC requirements for CE Marking self declaration:
    - **IEC 61000-6-1:2016** Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments
    - **IEC 61000-6-2:2016** Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments.
    - **IEC 61000-6-3:2016** Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments
    - **IEC 61000-6-4:2018** Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments.
    - **EN 55011:2011+A1:2011** Equipos industriales, científicos y médicos. Características de las perturbaciones radioeléctricas. Límites y métodos de medición.
    - **CISPR-11:2015+AMD1:2016+AMD2:2019** Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement
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## Applicable Standards

### 3. Grid Quality Standards for converters:

- **IEC 61000-3-11:2017** Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current  $\leq 75$  A and subject to conditional connection
- **IEC 61000-3-3:2013+AMD1:2017** Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection
- **IEC 61000-3-12:2011** Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current  $>16$  A and  $\leq 75$  A per phase
- **IEC 61000-3-2:2018+AMD1:2020** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current  $\leq 16$  A per phase)
- **IEC 61000-3-4:1998** Electromagnetic compatibility (EMC) - Part 3-4: Limits - Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A

## Applicable Standards

### 4. Zero-Injection connection requirements:

- **UNE 217001:2020** Ensayos para sistemas que eviten el vertido de energía a la red de distribución  
*Tests for systems intended to avoid the energy transmission to the distribution network.*
- **Real Decreto 244/2019, de 5 de abril**, por el que se regulan las condiciones administrativas, técnicas y económicas del autoconsumo de energía eléctrica  
*RD by which administrative, technical and economical conditions are regulated for the self consumption*
- **ITC BT 40** Instalaciones generadoras de Baja Tensión (Low Voltage intalation for Generation)

Requirement for any system connected to any grid with a Zero-Injection system or acting as a self consumption installation

# Applicable Standards

## 5. Distribution grid connection requirements:

- **UNE 217002:2020** Inversores para conexión a la red de distribución. Ensayos de los requisitos de inyección de corriente continua a la red, generación de sobretensiones y sistema de detección de funcionamiento en isla  
*Grid connected inverters. Testing of requirements for DC grid injection, overvoltage generation and island operation detection system*
- **UNE 206007-1:2013 IN** requisitos de conexión a la red eléctrica. parte 1: inversores para conexión a la red de distribución  
*Grid connection requirements to the electrical grid. Part 1: Inverters connected to the distribution network*
- **ITC BT 40** Instalaciones generadoras de Baja Tensión (Low Voltaje intalation for Generation)

Requirement for any equipment connected to a grid managed by any of the Distribution System Operators (DSO) in Spain

## Applicable Standards

### 6. Grid connection requirements (Distribution & transmission systems):

- **NTS631V2.1 SEPE:** Norma Técnica de Supervisión de la conformidad de los módulos de generación de electricidad según el Reglamento UE 2016/631: NTS-631 v2: Revisión 2.1; Versión del 9 de Julio de 2021, que actualiza y modifica la versión 2 publicada el 3 de noviembre del 2020, con la Aprobación de la Orden TED/749/2020 y del Real Decreto 647/2020, y que sustituye las versiones anteriores “Revisión 1.0 del 18 de Julio de 2019” y “Corrección de errores y aclaraciones de la versión 1.0. 21/10/2019”; Sistema Eléctrico Peninsular (SEPE)  
*Supervision technical standard according electricity generation modules as indicated in the European regulation UE 2016/631: NTS-631 v2: review 2.1; Version published on July 9<sup>th</sup>, 2021, through the approval of the Order TED/749/2020 and the decree RD647/2020, which substitute and replace the previous versions “Review 1.0 from July 18th, 2019” and “Typo corrections and clarifications of version 1.0 published on October 21st, 2019”, and applicable on the continental area of Spain (SEPE)*
- **NTS631V1.1 SENP:** Norma Técnica de Supervisión de la conformidad de los módulos de generación de electricidad según el Reglamento UE 2016/631: NTS-631 v1: Revisión 1.1; Versión del 9 de Julio de 2021, que actualiza y modifica la versión publicada el 3 de noviembre del 2020, con la Aprobación de la Orden TED/749/2020 y del Real Decreto 647/2020; Sistema Eléctrico No Peninsular (SENP)  
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