



E.V.READY Specification for Installer Training Content

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1. Change tracking

Reference	Change	Edition	Date
EVR87	Initial document	01	September 13, 2016

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2. Background and purpose

This document provides the specifications to be followed to design an "E.V.READY installer" training course.

For this training course to be taken into account by the ASEFA certification body, the training material should address the issues presented in these specifications, while following the structure proposed in paragraph 3.

The E.V.READY 1.4 repository introduced the concept of installer skills level based on various criteria listed below:

- Performance and functionality level of the product to be installed
- Field of intervention
- Complexity of the installation

These three levels are referred to as Q1, Q2 and Q3: (See EVR68 in Appendix 1)

- Q1: base level
- Q2: specialist level
- Q3: expert level

Training requirements will be adapted to the classification of the skills levels.

This document presents the various themes and topics that the training course will develop, as well as the various stages of the course.

It specifies the requirements for each skills level from Q1 to Q3.

The grouping of the related training topics into modules will remain at the discretion of the training bodies.

Finally, this training course should be sanctioned by an examination designed to assess the knowledge acquired by trainees at the end of the course.

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3. Training course structure

The training material will have to follow the structure shown below:

The structure of the course is not required to follow the order of requirements as presented below:

Each requirement must be referenced in the training material (traceability tracking).

Presentation:
For each requirement: <ul style="list-style-type: none"> - Display the requirement EVxx number - Display the requirement (official text of the technical requirements table) - Explain the purpose of the requirement for E.V.READY - Explain how the requirement should be implemented

3.1 Common core for all 3 levels Q1, Q2, Q3

3.1.1 General information on electromobility

- Presentation of electromobility, economic, environmental and social challenges.
- Rechargeable electric and hybrid vehicle. Presentation of the charging of the electric vehicle (mono or tri), the 4 charging modes, various types of plugs, charging power, charging time, EV/charging station communication, focus on the situation of the each concerned country. Reminder of the reference standards IEC 61851-1...

Educational goal:

- *The installer must be able to provide the end customer with relevant information.*

3.1.2 Presentation of E.V.READY

- Presentation of E.V.READY / Transition from ZE-Ready to E.V.READY / E.V.READY to ZE-Ready prerequisites (since June 2015)

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- Certification process for installers: registration with ASEFA, introduce ASEFA, installation company categorization according to E.V.READY, E.V.READY product categorization, classification of E.V.READY installers.
- Presentation of the applicable E.V.READY technical requirements table, management of technical requirements upgrades.

Educational goals:

- *Acquire a good overall knowledge of the E.V.READY certification process for products and installations.*
- *The installer must also be able to explain to the end customer the contribution of the E.V.READY mark on an EV charging installation, as well as the reputation of E.V.READY in the market.*
- *The installer must know the rights and duties attached to the use of the E.V.READY mark.*

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3.1.3 Evaluation before installation

- Energy capacity of the installation (energy management, charging power vs. subscription), mono or tri, 400V or 230V, power connection and subscription.
- Presence of an electric panel (main or secondary), available slot in the electric panel.

➤ EV7:
<ul style="list-style-type: none"> - Presence of a ground connection, ground connection resistance measurement, value < 100 ohms - Checking of the interconnection of equipotential lines

➤ EV31:
<ul style="list-style-type: none"> - Presence of a surge protector in the initial installation - Presence of a lightning rod

- Complete an observation checklist
- Compatibility of the recharging installation to be achieved with the legacy system: case analysis to develop during the course (minimum 3 cases).

Educational goals:

- *Present to the installer the checks and verifications to be carried on the existing installation.*
- *The installer will be able to complete a fact sheet on the condition of the installation before beginning the work.*

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3.2 Implementation of requirements for the installation

➤ EV3 (Q2, Q3):
<ul style="list-style-type: none"> - If the additional isolation device is not placed in the charging station, it must be installed upstream and controlled by the charging station detection system.

➤ EV7, EV8 (Q1, Q2, Q3) :
<ul style="list-style-type: none"> - Reminder on the TT and TN grounding diagram - Various methods for measuring the resistance of the grounding (loop measurement, 3 rods method) - Use of the E.V.READY tool (explanation of its implementation) - If ground measurement NOK: solutions to be applied <ul style="list-style-type: none"> ✓ Installation of an additional ground rod (introduce and explain the method) ✓ equipotential interconnection with the other ground connections / case of the upstream TN-C diagram (Q2 and Q3 levels) ✓ If the improvement measures do not reach a value <100 Ohm, intervention of a Q2 or Q3 level.

➤ EV9 (Q2, Q3):
<ul style="list-style-type: none"> - The IT system is prohibited in direct use - Creation of a TN-S block with installation of an insulation transformer

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➤ **EV10 (Q1, Q2, Q3):**

- Reminder of local regulations applicable to plugs.

French example: NF-C 15100 article 555.1.8.

➤ **EV12, EV17 (Q1, Q2, Q3):**

- Clarify that protection per charging point is necessary, a common RCD is possible.
- A circuit breaker adapted by plug and wire diameter (e.g. 20A circuit breaker for a 16A plug)

French example: reminder of the UTE C 15-722 guide

➤ **EV14 (Q1, Q2, Q3) :**

- Reminder of the selection criteria in the case of an outdoor installation
- Installation precaution as per the IK values (height of the installation)

French example: E.V.READY more stringent in E.V.READY than the UTE C 15 722 guide

➤ **EV22 (Q2, Q3):**

- Use of the installation's ground connection in each charging station + creation of an additional ground connection every 10 charging points with interconnection of all the ground connections to ensure equipotentiality.

➤ **EV23 (Q2, Q3):**

- Explain the principle of self-resetting by local device for the RCD or circuit breaker in

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case of default.

- Remote resetting in case of default as per local regulations.

French example: automatic resetting is prohibited

➤ **EV29 (Q1, Q2, Q3) :**

- With a charging current between 8 and 10A the plug is not specific, present EV17 & EV29 Annex of the E.V.READY technical requirements table
- $\geq 10A$ one dedicated line with a minimum wire at 2.5 mm²
- The installer must check that the installed socket is E.V.READY compliant

French example: refer to Annex LL of the NF C 61-314 standard.

➤ **EV31 (Q1, Q2, Q3):**

- Implement local regulations regarding the need for a surge protector, and depending on the presence of a surge protector in the product or the installation.
- Present the recommendations to be followed for the implementation and installation of a surge protector.

French example: need for surge protector in accordance with:

- ✓ *The keraunic area: present the map of France with keraunic areas (to be adapted for other countries)*
- ✓ *Presence of an overhead line*
- ✓ *Presence of a lightning rod*
- ✓ *Specific information on lightning strike if known.*

➤ **EV43 (Q1, Q2, Q3):**

- Measuring the neutral ground voltage

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- Present the assumptions that lead to a neutral ground voltage >10V
- Poor ground loop, in that case improve the grounding line
- Rupture or improper grounding of the N-wire at the distribution transformer, in this case, inform the provider. To discriminate, one must measure the ground connection locally using the 3 rods method.
- An imbalance between the 3 phases may generate voltage on the N-wire: Conduct an amperometric measurement of the voltages of each phase without consumption on the installation.
- If >10V rms: how to identify the reasons and how to implement a correction
- If unresolved: install an insulation transformer. Present the conditions and the installation diagram (upstream and downstream PE link).

- **EV44, EV45 (Q1, Q2, Q3):**
- Explain what the harmonic disturbances mean and what their consequences are
 - How to assess the quality of the network and the harmonic distortion rate
 - How to implement a corrective solution in case of disturbances
 - How to use the E.V.READY tool to conduct that assessment

- **EV49 (Q3):**
- Installing an insulation transformer:
- When to install an insulation transformer
 - How to install an insulation transformer and recreate a TN-S ground system on the secondary of the transformer

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➤ **EV50 (Q3):**

Installation of an insulation transformer in the case of an excessive line impedance if the distribution transformer is too far from the installation.

- Calculation of the voltage drops depending of the line impedance and the distance to the distribution transformer.

➤ **EV51 (Q3):**

Installation of an insulation transformer if the N-wire is not distributed:

- Check the presence of the N-wire

3.3 E.V.READY tool

This tool is under development, but a description of its use to test the relevant requirements must be presented during the training course.

3.3.1 Presentation of the E.V.READY tool

3.3.2 Implementation of the E.V.READY tool

3.3.3 Control process with the E.V.READY tool

- Requirements covered by the verification

3.4 Completing the self-checking form

3.4.1 Presentation of the self-checking form

- Presentation of the E.V.READY self-checking form or an equivalent form.

3.4.2 How to complete the self-checking form

- Conduct a case study to complete the self-checking form.

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4. Skills level of the E.V.READY trainer

This skills recognition is valid 5 years. The trainer should demonstrate to the ASEFA certifier that he has the following skills:

- Technical and regulatory knowledge:
 - Degree in the electrical field
 - Study and design of Low Voltage electrical installations (proof of a minimum 5 days training) or equivalent experience (less than 3 years)
- Training of trainers (less than 3 years) or recognition of a training experience in the electrical field.
- Technical level of an E.V.READY trainer:
 - Mastery of E.V.READY is paramount (EVREADY certification process, E.V.READY technical requirements table, use of the E.V.READY installation tool, case study)

French additional specific requirements:

- *Electrical accreditation - initial - B1, B1V, B2, B2V, B2V tests, BC, BR electricians. Individual in charge of operations in LV: BE measurement, BE verification (proof of a minimum 5 days training) or equivalent level.*
- *Electrical accreditation - initial – electric vehicle (proof of a minimum 2 days training).*

Note: The ASEFA certification body reserves the right to conduct a "class background" audit during a training session to confirm the trainer's skills. The educational tool as a whole and the trainer's teaching methods will also be assessed.