IECRE 02 – PV SUP

IECRE PUBLICATION

IEC System for Certification to Standards relating to Equipment for use in Renewable Energy applications (IECRE System)

Supplement for the Photovoltaic Sector to the IECRE Rules of Procedure (IECRE 02)
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE System) –

Supplement for the Photovoltaic Sector to the IECRE Rules of Procedure (IECRE 02)

FOREWORD

This publication has been prepared by the IECRE for approval by the IEC Conformity Assessment Board (CAB). This publication supersedes IECRE 04, Edition 3, published 2019-07-04.

The Photovoltaic Renewable Energy industry includes devices and systems that convert solar irradiation into electric current. There is a need for a single, internationally-recognized 3rd party Conformity Assessment (CA) system for the verification of compliance to consensus-based International Standards and Technical Specifications to reduce risk and improve stakeholder confidence. The Photovoltaic Energy Certification Scheme is aimed at increasing the quality of photovoltaic devices and systems manufactured and constructed by the industry, thus reducing risk and increasing confidence in the market.

This publication has been prepared by REMC WG 001 for approval by the REMC.

The annexes to this publication are normative.

The text of this publication is based on the following document(s):

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INTRODUCTION

This publication contains the Supplement to the IECRE Rules of Procedure (RoP) for the Photovoltaic (PV) Sector under the IECRE Conformity Assessment System. The term “Photovoltaic Energy Converter” is used to describe Renewable Energy Equipment in the PV Sector. This Supplement to the IECRE RoP complies with IEC CA 01, Basic Rules and IECRE 02, Rules of Procedure. IECRE rules and documents, and a list of standards approved for use in the PV Certification Scheme, can be found at www.iecre.org.

This Supplement defines the PV specific revisions required to IECRE 02 and outlines the structure and governance of the IECRE PV Sector related activities (the “PV Sector”), the principles of the PV CA Schemes and procedures for acceptance of Renewable Energy Certification Bodies (RECB) and Renewable Energy Inspection Bodies (REIB) applying to work within the PV Certification Scheme. Additional operational documents (ODs) specify PV Certification Scheme deliverables, such as certificates, conformity statements and test reports, in order to operate the system. This Supplement, and the associated ODs, establishes a framework for the mutual recognition of PV Certification Scheme deliverables among and between inspection bodies and certification bodies. Applications may be made to the REMC for the establishment of additional body categories.

The PV Sector operates within the scope of the IEC TC82 standards and other relevant internationally accepted standards and best practices.

The procedures in this document refer to a certification scheme for components, quality systems, design, installation, safety, and performance of power plants based on third party conformity assessment of a PV power plant at a specific location. Such certification scheme is considered equivalent to an ISO/IEC 17067 Type 5 Certification Scheme, and a RECB may then issue an IECRE Certificate of Conformity.
IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE System) –

Supplement for the Photovoltaic Sector to the IECRE Rules of Procedure (IECRE 02)

1 Scope

The scope of the PV-SWG is to operate an international PV Certification Scheme for Photovoltaic photon-to-electron conversion systems by way of photonic energy being converted to electric current. Participation in the PV-SWG shall include certification bodies, inspection bodies and other stakeholders that are members in good standing of a Member Body.

The PV-SWG mission is to define the certification schemes for the solar photovoltaic (PV) sector. The PV-SWG shall focus on issues that are specific to the PV sector – and related activities such as Hybrid/Microgrid systems in coordination with REMC WG 008 (e. g. involving battery systems) – and value that can be provided to investors and stakeholders within the sector.

This publication contains the Rules of Procedure specific to the PV-SWG under the IECRE Conformity Assessment System that are used in addition or in alteration of IECRE 02, hereinafter referred to as the “RoP”, intended for use in photovoltaic energy applications and which comply with IEC or other internationally accepted standards, or PV sector specific, generally accepted best practices, or guidelines. In the event that other than IEC or ISO standards or TS are referenced, both REMC and CAB approval shall be required. A list of standards in use is published on the IECRE website: www.IECRE.org. This list reflects updates and transition periods not yet implemented in Operational Documents (OD’s).

2 Normative References

In addition to IECRE 02, relevant normative references can be found in the following documents:

ISO guide 73: Risk management — Vocabulary
ISO 31000: Risk management
ISO 14000 series: Environmental management
ISO 55000 series: Asset management
ISO 13374 series: Condition monitoring and diagnostic of machine systems standard

2.100 Other references

The Industrial Internet Consortium Reference Architecture (IICRA)
International Association of Classification Societies (IACS)
Quality Management System Certification Scheme (QSCS)

Any IECRE operational document (“OD”) with the identifier OD-4XX, where “X” is any digit between 0 and 9. Subsections to OD-4XX can be broken down to OD-4XX-X or OD-4XX-X-X, as the case may be.

3 Definitions and Abbreviations

IECRE 02 Clause 3 applies. In addition, the following definitions are essential:

3.100 Definition of terms

Component

A part of a PV power plant, with specific design, materials and parts, fabricated according to a common manufacturing process and uniquely described by a specific range of parameters and design conditions.
Engineering Procurement Construction (EPC)

Company in charge of the engineering, procurement and construction of the PV power plant.

Factory-Quality Auditor

Person that performs services leading to conformity assessment of quality management system in the PV component suppliers and service providers to the relevant IEC standards.

Power conversion equipment (PCE)

Equipment and components for electronic power conversion of electric power into another kind of electric power with respect to voltage, current and frequency.

Product type certificate

Document issued upon successful completion of a product certification based on ISO/IEC 17067 certification types.

Certificates of conformity issued under the IECEE CB scheme are recognized for the purposes of the IECRE-PV scheme.

PV power plant (PV plant)

Power plant for generating electrical power according the categories describe after, in which one or more PV inverters are connected to a PV array; including all elements of foundation, support structure, wiring and any other balance-of-system (BOS) equipment up to connection point with the utility (including medium voltage equipment as appropriate).

SCADA (Supervisory control and data acquisition)

A system operating with coded signals over communication channels so as to provide control of remote equipment.

3.101 Definition of system size and assembly categories

The system size category (S) and construction category (C) of the PV power plant, shall be recorded on the certificate and any associated test or inspection reports.

PV power plant categories by usage are as follows:

S1: “Utility scale” Operated by commercial organization on commercial property, >10.000 kWp AC or as local rules or codes may define differently (currently still referred to as “U1” in OD-40X).

S2: “Large Commercial and Industrial” Operated by commercial organization on commercial property, ≤10.000kWp AC but >1.000 kWp AC or as local rules or codes may define differently (currently still referred to as “U3” in OD-40X).

S3: “Medium Commercial and Industrial” Operated by commercial organization on commercial property, ≤1.000kWp AC but >100 kWp AC or as local rules or codes may define differently (currently still referred to as “U3” in OD-40X).

S4: “Small Commercial and Industrial / Residential” Operated by private individual or small commercial organization, disaggregated, ≤100kWp AC or as local rules or codes may define differently (currently still referred to as “U2” in OD-40X).

S5: “Aggregate Power plants” Operated by private individual or professional or commercial organizations on private or public property, standardized procedures, standardized contract procurement, standardized design, standardized construction, standardized commissioning, standardized monitoring (currently still referred to as “U4” in OD-40X).

PV power plant categories by construction categories are as follows:
C1: Ground mounted, not part of a building (currently still referred to as “L1” in OD-40X)

C1-1: Ground mounted, fixed tilt (currently not referred to in OD-40X)

C1-2: Ground mounted, tracked (currently not referred to in OD-40X)

C2: Roof mounted, not part of the building envelope (e.g. rack or pan mount) (currently still referred to as “L2” in OD-40X)

C3: Roof mounted, integrated in the building envelope (e.g. BIPV) (currently still referred to as “L3” in OD-40X)

C4: Combined use (e.g. car-port) (currently still referred to as “L4” in OD-40X)

C5: Floating PV, that is a PV power plant floating on liquid surface, e.g. a lake or off-shore (currently not referred to in OD-40X)

### 3.102 Definition of system lifecycle phases

The system lifecycle phase of the PV power plant determines the relevant type of certificate for which assessment is performed.

![Figure 1: PV power plant lifecycle phases and applicable Operating Documents](image)

**4 Organizational Structure**

IECRE 02 Clause 4 applies.

**5 Requirements for Participation in the IECRE System**

IECRE 02 Clause 5 applies.

**6 Deliverables of the IECRE System**

IECRE 02 Clause 6 applies with the following additions:

#### 6.1.100 IECRE Test Reports (RETRs)

Test Reports issued by a competent IECEE accepted test laboratory, (known as a CB Test Laboratory (CBTL)) and issued to support the granting of a product certificate, or as a National Certification Body (IECEE NCB), may be accepted in the PV Sector of the IECRE System as outlined in the applicable PV OD(s).

#### 1.1 IECEE Product Certificates

Certificates issued by a competent IECEE approved National Certification Body (IECEE NCB), may be accepted in the PV Sector of the IECRE System as outlined in the applicable PV OD(s).
Additional requirements for the issuance of a Product Certificate in the PV Sector against the technical standards covered by this scheme are detailed in the ODs under the OD-4XX series.

6.2 IECRE Certificates

IECRE PV Certificates provide confidence in the safety, performance, and quality of PV projects. Certificates provide for:

PV power plant certificates cover different stages of the PV power plant lifecycle as shown in Figure 1 in section 3.102 and
Quality certificates ensure the quality critical components used in a PV power plant and important processes of system installation and operations & maintenance.

6.2.100 PV power plant certificate

6.2.100.1 PV Plant Design Qualification Certificate: Part 1 - PV Site Qualification (OD401-1)

The certificate provides the basis to create a plan for a project at a specific site including data needed for civil engineering. It determines land access (road, zoning, flood zone, earthquake) and soil composition, grid access, available solar resource, identification of permitting issues, property, or right of individual or party.

6.2.100.2 PV Plant Design Qualification certificate (OD-403)

PV Project Design certificate design review requires assessment of both the design and a specific location for implementation. The technical aspects cover the electrical and mechanical design of the PV power plant, and the equipment specified. The documentation, including construction drawings is assessed.

OD-403 has been published as a draft and is under review and development.

6.2.100.3 PV power plant certificate (OD-401)

A PV power plant certificate of conformity covers the electrical and mechanical work of the PV plant and assesses if they are installed and functioning as designed against specified requirements defined in OD 401. This certificate coupled with the initial performance measurement may be used for the Final Acceptance of the PV plant.

6.2.100.4 Annual PV plant performance certificate (OD-402)

Annual performance certificate covers ongoing performance of the PV power plant, and reports performance data from a full year of operation so as to quantify the observed performance of the plant to enable comparison with expected performance. It also documents the maintenance costs to achieve stated performance and availability. Evaluation is performed against the specified requirements defined in OD 402.

6.2.100.5 PV plant operational status assessment (OD-404)

OD-404 was developed PV plant transfer certificate covers the past performance, current condition and anticipated future performance of a PV plant based on an assessment that includes OD-402 Annual PV Plant Performance Certificate and relevant IEC standards, or similar. In addition, the assessment includes historical plant documentation (such as as-built documentation, historical weather and plant performance data, and operations and the preventative maintenance plan. The assessment may be applied to any PV plant using Class A, B, or C accuracy, as defined in IEC 61724-1 for the performance assessments. Similarly, the review of maintenance and other records will have expectations aligned with the type of assessment: U1, U2, U3, or U4.

6.2.101 Quality management certificates

A supplier’s and service provider’s quality management certificate covers conformance of the their quality system for the component and equipment specified in the design of the power plant and services for installation and O&M to the relevant IEC standards or equivalent. Requirements for certification are defined in OD 405 and OD410.

6.2.101.1 Quality management certificate for PV module manufacturer (OD-405)

Quality management certificate for PV module manufacturer covers all the process of PV module manufacturing and after-sales services. Requirements for certification are defined in IEC 62941 and OD 405.
6.2.101.2 Quality Management Certificate for PCE manufacturer

Quality management certificate for PCE manufacturer covers all the process of PCE manufacturing and after-sales services. Requirements for certification are defined in IEC 63157.

6.2.101.3 Quality Management Certificate for PV plant installer and O&M service provider (OD-410)

Quality management certificate for PV plant installer and O&M service provider covers all the process of PV plant installation and O&M service execution. Requirements for certification are defined in IEC 63049 and OD 410.

6.2.102 IECRE Product Certificates

PV Product certificates, such as for PV Trackers, are under discussion.

6.2.103 IECEE Product Certificates

Certificates issued by a competent IECEE approved National Certification Body (IECEE NCB), may be accepted in the PV Sector of the IECRE System as outlined in the applicable PV OD(s).

6.2 Conformity Statements see IECRE 02

6.3 Inspection Reports see IECRE 02

6.100 Exchange of PV Certification Scheme Deliverables

The Product IECRE PV Certification processes may depend upon other IECRE PV Certification Scheme deliverables issued by the REIBs or RECBs approved to operate within the PV Sector system – mutual recognition and acceptance.

NOTE: A PV Project Certificate can include any certification according to the following level 0 scheme

- OD-40X-series
- 408-series — Templates for certificates etc. — maybe subject to modification and addition
- 401 — 410 except 408-TXX will be transferred to new structure
- OD-41X-series: Rating system
- OD-42X-series: (Placeholder)
- OD-43X-series: Certification hardware components
- OD-44X-series: Certification hardware system
- OD-45X-series: Certification industry stakeholders

Consequently, RECBs and/or REIBs participating in the IECRE PV Certification Scheme shall accept PV Certification Scheme deliverables issued by other RECBs and/or REIBs participating in the PV Sector system. Likewise, RECBs are encouraged to accept test laboratory certificates including the test reports issued by an IECEE NCB or CBTL or to integrate the result of test laboratory reports issued by an IECEE CBTL into its own certification.

This is enabled by ensuring that PV Certification Scheme deliverables are issued according to detailed descriptions and requirements given in the associated Operating Documents. The PV Certification Scheme deliverables shall be supplemented by a final evaluation report that will enable the receiver of the deliverable to understand the extent of the certification.

7 Description of IECRE Operational Procedures

IECRE 02 Clause 7 applies.

8 Peer Assessment Program Bodies

IECRE 02 Clause 8 and IECRE 02-1 applies apply with the following additions:

8.1 Acceptance of RETLs – not applicable

Not applicable as RETLs do not currently exist within the PV Sector of the IECRE System.

8.2 Acceptance of RECTFs – not applicable

Not applicable as RECTFs are currently not foreseen within the PV Sector of the IECRE system.

Note: The PV Sector of the IECRE System may consider RETLs for future Schemes.
Note: The acceptance of CBTL / NCB test reports and certificates from the IECEE System, as outlined in Clause 6.1, are subject to the Rules of Procedure of the IECRE system.

8.28.3 Acceptance of RECBs
A certification body shall be accepted as an RECB under the conditions described in OD-471 (to be approved).

8.38.4 Acceptance of REIBs
An inspection body shall be accepted as an REIB under the conditions described in OD-472 (to be developed).

8.4 Acceptance of RECTFs – not applicable –
Not applicable as RECTFs are currently not foreseen within the PV Sector of the IECRE system.

8.100 Acceptance of Peer and Lead Assessors
In addition to Clause 8 of IECRE 02, the Qualification Criteria for Peer and Lead Assessors for the PV Sector of IECRE are described in the OD-481 series.

100 Complaints
Where an RECB or REIB identifies a problem or question related to a deliverable issued by another RECB or REIB or by an IECEE NCB/CBTL (for PV related component type certificates), the RECB or REIB shall raise the matter first with the Applicant, then the RECB or REIB shall raise the matter with the organization that initially issued the deliverable. If the RECBs or REIBs involved arrive at different conclusions, the case shall be referred to the IECRE Executive Secretary.