



IECRE OPERATIONAL DOCUMENT

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

**IECRE Quality System Requirements for PV Plant Installation and
Maintenance – Part 1: Requirements for certification**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

CONTENTS

1	Scope	4
2	Normative references	4
3	Terms and definitions	4
4	Quality assurance system requirements	4
4.4	Auditor selection.....	5
4.5	Stages of audit	6
5	PV Service-Provider Auditors	6
6	Pass/Fail criteria of IEC TS 63049	9
6.1	The client organization shall demonstrate their ability to consistently provide product and services that meet customer and applicable statutory and regulatory requirements, and shall incorporate requirements for the continual improvement of the effectiveness of the QMS. (See ISO 9001:2015 section 1).....	9
6.2	The following Pass/Fail criteria shall be applied in the audit.	9
7	Expiration of the certificate, Surveillance Audit, and Re-Audit.	9
7.1	Expiration of the certificate	9
7.2	Surveillance Audits	9
7.3	Re-Audits	9
	Annex A – PV Service-provider Auditor Qualifications Table.....	10
	Annex B – PV Factory Audit Log (informative)	11
	Annex C – PV Service-provider Auditor CPD Log (informative).....	12
	Bibliography	13

IECRE Quality System Requirements for PV Plant Installation and Maintenance – Part 1: Requirements for certification

INTRODUCTION

This Operational Document, OD 410-1, sets out the IECRE System requirements for installer's and operations and maintenance (O&M) providers' quality systems, relating to the installation and O&M of PV systems.

OD 410, *IECRE Quality System Requirements for PV Plant Installation and Maintenance*, has now been published in two parts:

- *Part 1: Requirements for certification*
- *Part 2: Audit Checklist*

This Document needs to be read in conjunction with IEC/TS 63049.

The purpose of this Document is to embrace the good practices that are appropriate to PV systems.

Document History

Date	Summary
2018-05-01	PV-OMC/162/RV
2020-06-15	REMC/461/RV

1 Scope

1.1 General

This Document specifies particular requirements and guidance on the establishment and maintenance of a quality system (not the individual implementations – the audit is of the organization, not of each site) to meet the requirements of the IECRE Scheme. It does not preclude the use of other quality systems that are compatible with the objectives of ISO 9001 subject to the acceptance of an RECB. Therefore, when RECBs assess the quality systems of installers and Operations and Maintenance (O&M) providers, this document shall be the basis of the initial assessment and subsequent surveillance visits. An application form for the RECB is included in Clause 6.

1.2 Permissible exclusions

The installer or O&M provider may only exclude quality management system requirements within Clause 4, with the agreement of the RECB, provided that conformity of the end result can still be demonstrated.

2 Normative references

This Document incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Document only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

IEC/TS 63049 *Terrestrial photovoltaic (PV) systems – Guideline for effective quality assurance in PV system installation and operations and maintenance*

ISO/IEC 17021 Conformity assessment-Requirements for bodies providing audit and certification of management systems

ISO 9001 Quality management system – requirements

IAF MD1:2007 IAF Mandatory Document for the Certification of Multiple Sites Based on Sampling

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the International Electrotechnical Commission Glossary (<http://std.iec.ch/glossary>) and the following apply.

3.1 PV Service-provider Auditor

3.2 A type of PV Service-provider Auditor defined in IECRE 04 that performs conformity assessment of quality management system of the PV service provider to the relevant IEC standards. PV service-provider includes, but not limited to, installer and O&M servicer, **Site of client**

Example locations of where the client's current or previous work may be viewed as well as any office (physical or virtual) area that is used for retaining records.

4 Quality assurance system requirements

4.1 General requirements

4.1.1 Refer to IEC/TS 63049 for applicable requirements to be covered in the audit.

4.1.2 Refer to OD 410-3 for Requirements for PV Plant Inspectors.

4.2 Audit Process

4.2.1 The audit process shall encompass audit planning, audit execution, reporting, surveillance and maintenance of the certification. The process shall include handling complaints and feedback regarding the audit process.

4.2.2 The Certification Body shall ensure that:

- i) Only competent audit team members that meet qualification and experience requirements are assigned to audits.

- ii) Audit plans cover all areas and activities applicable to the standard/ specification covered by the scope of the audit.
- iii) The audit shall be managed by a team leader, competent in at least one of the audited standards/specifications.
- iv) Sufficient time is allocated to accomplish a complete and effective audit of the organization's management system covered by the scope of the audit and as estimated in section 4.3.2.

4.2.3 Audit reports shall be prepared and documented in a manner as specified in OD-408-T03. Each finding raised in a report shall be traceable to the applicable standard(s)/specification(s).

NOTE: The typical process flow for the audit and certification process is outlined in figure E.1 of ISO/IEC 17021:2015.

4.3 Audit Sampling and Audit time

4.3.1 Audit Sampling:

For organizations executing installations, the initial certification audit shall be required for all the operating teams and Surveillance and Recertification audits should be sampled based on the formula provided in section 5.2.3 of IAF MD 1:2007. The inspected sites should be sampled from current construction projects. For organizations providing O&M services, the initial certification audit shall be required for main office and at least more than one of the operating teams. Surveillance and Recertification audits should be sampled based on the formula provided in section 5.2.3 of IAF MD 1:2007. The sites should be sampled from those that have ongoing service contracts. Selection criteria should also take into consideration guidelines provided in section 5.1.4 of IAF MD1:2007.

4.3.2 Audit time

4.3.2.1 To determine the audit time, the Certification Body shall:

- a) Calculate the required audit time by the relevant application documents and/or scheme rules for each standard. It is important to include all headcount (full time, part time, contract from all shifts in the audit person days headcount calculation).
- b) Calculate the starting point "T" for the duration of the audit.
- c) Adjust the starting point figure by taking into account factors that may increase or reduce the time required for the audit.

The factors for reduction shall include but are not limited to:

- i) Design responsibility of the organization
- ii) Extent of manual processes
- iii) The complexity of the audit^{SEP}
- iv) Maturity of the management systems (consideration for surveillance)

d) Inform the client that the duration of the audit based on the declared level of the organization's management system may be subject to adjustment on the basis of confirming the level of complexity at stage one and subsequent audits.

4.3.2.2 Adjustment of the audit time shall not exceed 20% from the starting point "T", unless there is specific documented agreement between the client and the CB.

4.3.2.3 The starting point figure and justification for increase or reduction shall be documented.

NOTE: The Advanced Surveillance and Recertification Procedures (ASRP) as per IAF MD3:2008 may place greater (but not total) reliance on the organization's internal audit and management review processes.

4.4 Auditor selection

4.4.1 Please refer to 5.4 Application, Qualification, and registration of PV Service-Provider Auditors. Additional information is available from ISO/IEC 17021 Part 3: Competence

requirements for auditing and certification of quality management systems [Technical Specification].

4.5 Stages of audit

4.5.1 Stage 1 is required for the initial certification and significant scope extension to the existing certification. (e.g., Addition of new installation technology). Stage 1 is not required for adding new operating teams or new installations as long as the management systems from the existing registered certification are applied.

4.5.1.1 Stage1 (initial audit): Some of the objectives are

- a) review the client's management system documented information;
- b) determine the preparedness for *stage 2*;
- c) obtain necessary information regarding the scope of the management system, including:
 - the organizational structure
 - processes and equipment used;
 - levels of controls established (particularly in case of multiteam clients);
 - applicable statutory and regulatory requirements; ^[1]_{SEP}

4.5.1.2 Evaluate if the internal audits and management reviews are being planned and performed, and that the level of implementation of the management system substantiates that the client is ready for stage 2.

4.5.1.3 The stage 1 audit may take place at the site(s) of operation of the client (including both operations at PV plant sites and any (physical or virtual office) site that is used for storage of records, etc. CB shall decide if this can be effectively carried out as a desk audit or a remote audit. It is anticipated that the audit will include visiting multiple PV plants that are examples of current or past work of the client in addition to visiting the office site that is used for storage of records after work at a PV plant has been completed.

4.5.2 Stage 2 (surveillance audit):

The purpose of stage 2 is to evaluate the implementation, including effectiveness, of the client's management system.

4.5.2.1 In determining the interval between stage 1 and stage 2, consideration shall be given to the needs of the client to resolve areas of concern identified during stage 1. The client shall be informed that the results of stage 1 may lead to postponement or cancellation of the certification process. The stage 2 shall take place at the site(s) of the client including PV plants that provide evidence of current or past work as well as any locations in which records are stored. ^[1]_{SEP} See additional details in ISO/IEC 17021:2015 sections 9.3.1.2 and 9.3.1.3.

5 PV Service-Provider Auditors

5.1 Certification Body Responsibilities

Overall responsibility for qualification and registration of the PV Service-provider Auditors and Trainees rests with the RECB.

5.2 PV Service-Provider Auditor

The PV Service-provider Auditor is responsible for carrying out initial certification audits of factories as well as routine surveillances (both pre-certification and post-certification) in accordance with the appropriate international standards, documented requirements, rules, guidelines, and procedures.

The PV Service-provider Auditor must successfully meet the requirements, which include, but are not limited to:

- Satisfy the IECRE RECB qualification process defined in section 3.2.1 in order to be authorized as PV Service-provider Auditor.
- Meet the minimum qualification requirements as per section 3 of this document.

- Successfully pass the supervision and training as per section 4 of this document. The term **PV Service-provider Auditor**, used throughout this document, is applicable for an IECRE PV Service-provider Auditor registered by the IECRE secretariat only.

5.3 PV Service-provider Auditor Trainee

The PV Service-provider Auditor Trainee is engaged in job specific training and is in the process of completion of the qualification process. The PV Service-provider Auditor Trainee is entitled to carry out an audit, whilst under supervision of a PV Service-provider Auditor or Lead auditor. Under such supervision, PV Service-provider Auditor Trainees are permitted to conduct initial certification audits as well as routine surveillances (both pre-certification and post-certification) in accordance with the appropriate international standards, documented requirements, rules, guidelines and procedures. See Annex A for details.

5.4 Application, Qualifications, and registration of PV Service-provider Auditors

5.4.1 PV Service-provider Auditor application

The application shall be submitted to the RECB accompanied by the documentation as far as applicable. The RECB shall endorse the candidate based upon review of the credentials and past experience.

The following application shall be completed by the candidate PV Service-provider Auditor and shall be submitted to the RECB for determination of acceptance.

NOTE: Incomplete applications will not be processed until full documentation has been received.

Applicant shall provide the information in the table below:

Name:	Click here to enter text.
Address:	Click here to enter text.
E-mail:	Click here to enter text.
Tel.:	Click here to enter text.

5.4.2 Initial training of PV Service-provider Auditors

Each applicant shall be trained in the following content:

a) ISO/IEC 17024 and 17021 (relevant clauses) e.g.:

- Technical Requirements
- Quality System
- Personnel

b) Inspection Methods and Procedures e.g.:

- Product review according to product certification documents
- Handling Inspection Samples
- Records
- Inspection Reports and Inspection Certificates.

c) Requirements for surveillance sample testing and test results evaluation as needed during the performance of PV Service-provider Auditor in the applicable product categories.

d) Familiarity with the IEC 61215 series, the IEC 61730 series, and all other standards listed in normative references of IEC 63049.

5.4.3 Other supporting skills

Each applicant shall provide written evidence, if applicable, for any of the following:

- Computer skills relevant to filling in surveillance reports and e-mail communication.
- Communication in English and appropriate regional language widely used in the client location.
- Other professional competency, for example, as shown in ISO 19011 (section 7.2.3).

5.4.4 Documentation of completion of qualification requirements for PV Service-provider Auditors

The requirements identified in Annex A apply to all grades of PV Service-provider Auditors. Evidence of audit experience shall be verified by the audited client (e.g. by authorized signature on the audit report or supporting letter), and shall include confirmation of the audit duration, audit objective, and role played in the audit (e.g. principal auditor, lead auditor or audit team member).

The following application shall be completed by the candidate PV Service-provider Auditor and shall be submitted to the RECB for determination of acceptance.

Application criteria	Documentation / Confirmation provided
1. Educational background	Indication of degree or certification.
2. General Work Experience	Listing of relevant work experience
3. Solar PV specific work experience	Listing of relevant solar work experience
4. Auditor training	Listing of training classes attended as per Annex C
5. Auditing experience	Listing of audit experience with customer signatures as per Annex B

NOTE: Time required for follow-up on corrective actions related to audit findings should not be counted toward the "Auditing experience".

In addition, voluntary collaborations with international PV committees will be taken into consideration as eligible experience. Evidence of this collaboration shall be provided and assessed by the corresponding RECB.

5.5 Maintenance of auditor qualification

The RECB is responsible to carry out annual training and supervision programs that cover but are not limited to:

5.5.1 Retraining and written test

The written test shall cover content of section 3.2.2.a) through f). Training updates from the latest changes to IEC and IECRE documents.

5.5.2 Review of auditor performance

The RECB shall review auditors' performance regularly based upon:

- a) Audit reports on a sampling basis by the certification body technical manager.
- b) Feedback from manufacturers (audit clients)
- c) Feedback from other certification bodies (for contract auditors).
- d) Feedback from Team lead auditor (where applicable)

The review cycle shall be conducted annually

Performance related improvement is addressed through additional training, closer supervision and mentoring by experienced auditors as decided by the RECB.

NOTE: Validation of the CB/IB's management of auditors is part of the Peer Assessment process.

5.6 Auditor certification renewal

Auditors shall accumulate the audit experience and submit every 3 years for renewal to the RECB for continuation of the grades or to request of upgraded status. Proof of continual professional development (CPD) totaling 45 hours should be submitted as an additional evidence during the 3 year renewal. This 45 hours may be accumulated at any point during the 3 year cycle. This CPD can be acquired through attending formal training on Quality Management systems, technical training relevant to PV Solar systems, attending PV solar conference, seminar, volunteering for PV Solar standards development, etc.

Other training that are permitted to be considered as an evidence for CPD are: Soft skills training (e.g. communication skills, conflict resolution and negotiation, personal effectiveness, creative problem solving, strategic thinking, management/business training, team building, influencing skills and other related training.

5.7 Promotion or disqualification of auditors

The RECB can nominate promotion of the PV Service-provider Auditors from auditor trainee based on review of the auditor performance in section 4.2. Auditors shall be disqualified if there is a continued poor performance or unacceptable behavior – violation of auditor ethics, unprofessional conduct. Auditor responsibilities

PV Service-provider Auditors are responsible to maintaining and upgrading their auditor grades by keeping their auditor qualifications and audit experience updated in an audit log as shown in Annex B.

6 Pass/Fail criteria of IEC TS 63049

- 6.1** The client organization shall demonstrate their ability to consistently provide product and services that meet customer and applicable statutory and regulatory requirements, and shall incorporate requirements for the continual improvement of the effectiveness of the QMS. (See ISO 9001:2015 section 1).
- 6.2** The following Pass/Fail criteria shall be applied in the audit.
- i) No major nonconformity shall be found in the audit. Certification shall not be issued until satisfactory corrective action response and an onsite follow up verification by the audit team.
 - ii) If any minor nonconformity is found, as defined in ISO/IEC 17021 clause 9.1.15 (c), certification shall not be issued until satisfactory correction of the situation, and its desktop verification, corrective action response by the lead auditor. Corrective action shall be verified in the subsequent surveillance audit.

NOTE: Major and minor nonconformance are defined below; originally taken from ISO/IEC 17021:2015.

Major nonconformity

nonconformity that affects the capability of the management system to achieve the intended results

NOTE 1 to entry: Nonconformities could be classified as major in the following circumstances:

- if there is a significant doubt that effective process control is in place, or that products or services will meet specified requirements;
- a number of minor nonconformities associated with the same requirement or issue could demonstrate a systemic failure and thus constitute a major nonconformity.

Minor nonconformity

nonconformity that does not affect the capability of the management system to achieve the intended results.

7 Expiration of the certificate, Surveillance Audit, and Re-Audit.

7.1 Expiration of the certificate

The certificate expires in three year after its issuance date. Surveillance audit is mandatory to maintain effectiveness of the certificate within this period.

7.2 Surveillance Audits

Surveillance Audits must be conducted at least annually, and no later than 12 months after the previous Audit. Surveillance Audits shall cover aspects of the organization's quality management system at the discretion of the nominated auditor. A report shall be produced identifying any areas requiring Corrective Actions.

The RECB in charge of the assessment and the certification, can extend above mentioned 12 months period up to 18 months based on the results of the assessment. In such a case, RECB shall notify its decision to the Executive Secretary for approval.

7.3 Re-Audits

Organizations shall be subject to a Re-Audit at the end of every three-year certification cycle. A Re-Audit shall be required prior to the expiry date of the organization's existing certificate, in accordance with RECB requirements. Three-months prior to the Re-Audit due date a new proposal and contract shall be created, covering the next three year cycle.

Failure to submit for a Re-Audit prior to the expiry date of the existing certificate shall result in a period during which the organization's certification shall be deemed to have expired and therefore continuous certification cannot be shown on subsequent certificates.

Annex A – PV Service-provider Auditor Qualifications Table

Auditor Grade	Educational Background	General Work Experience	Solar PV specific work experience*	Auditor Training	Auditing Experience
Auditor Trainee	Either a University degree / College diploma in engineering or certified / licensed master craftsman, technician or engineer in the relevant technical working field.	3 Years,	1 Years,	Attended a lead assessor/auditor training on ISO 9001 approved by an accreditation board from IAF OR, Attended auditor training or a training on IEC TS63049 requirements interpretation	None
Auditor	Same as above	4 Years,	2 Years,	Same as above	3 Full Management Systems audit, all elements of audit cycle, 10 days of which 5 on site

- *Manufacturing or downstream PV module experience acceptable.
- PV Module manufacturing experience preferable.

Annex B – PV Factory Audit Log (informative)

Audit Number	1	2	3	Etc.
Dates <i>(DD/MM/YY)</i> STATE: Start and finish dates of the audit on site				
Total Duration of Audit in days STATE: Number of days of your involvement (including off-site time)				
Audit Days spent on site STATE: Duration of your on-site days				
Contact details of the company audited (auditee) PROVIDE: Auditee contact name Complete address Telephone/fax number: E-mail address				
Role in audit				
Total Number in Audit Team (including yourself)				
Audit standard <i>(e.g. ISO 9001:2015)</i> STATE: Full Reference including date of standard				
Type of audit <i>(Surveillance; Second party; Third party)</i>				
Contact details of the company that employed you PROVIDE: Company name Complete address Contact Name Position within Organization Contact telephone number Email address				
Declaration of competence <i>(This person declares that the audit was conducted adequately and professionally and that the presented information is accurate)</i> PROVIDE: Name Position Auditor certification number: (if applicable) Contact telephone / fax number Email address Signature				

Annex C – PV Service-provider Auditor CPD Log (informative)

Item	1	2	3	Etc.
Dates (DD/MM/YY) STATE: Start and finish dates of the training				
Professional development hours STATE: Every day of training and conference accounts for 8 hours				
Training origination OR Volunteering organization PROVIDE: Training attendance sheet, conference badge, or letter from volunteering organizations signed by the chair of the interest group.				

Bibliography

IEC 62446-1 *Grid connected photovoltaic (PV) systems – Part 1: Minimum requirements for system documentation, commissioning tests and inspection*

IEC/TS 62446-2 *Grid connected photovoltaic (PV) systems – Part 2: Maintenance of PV systems*

IEC 62548 *Photovoltaic (PV) arrays – Design requirements*

and/or IEC/TS 62738 *Design guidelines and recommendations for photovoltaic power plants*

IECRE 01 *System Basic Rules*

IECRE 02 *System Rules of Procedure*

IECRE 04 *PV-OMC Rules of Procedure*

ISO/IEC 17020 *Conformity assessment – Requirements for the operation of various types of bodies performing inspection*

ISO/IEC 17025 *General Requirements for the Competence of Testing and Calibration Laboratories*

ISO/IEC 17065 *Conformity assessment – Requirements for bodies certifying products, processes and services*

IAF MD5:2015 DETERMINATION OF AUDIT TIME OF QUALITY AND ENVIRONMENTAL MANAGEMENT SYSTEMS

**INTERNATIONAL
ELECTROTECHNICAL
COMMISSION**

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
info@iec.ch
www.iec.ch

**IEC SYSTEM FOR CERTIFICATION TO STANDARDS
RELATING TO EQUIPMENT FOR USE IN RENEWABLE
ENERGY APPLICATIONS (IECRE SYSTEM)**

IECRE Secretariat c/o IEC
3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
secretariat@iecre.org
www.iecre.org