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# SunSpec Product Certification

## Product Certification Specification



### Abstract

This specification describes policies and mechanisms for independent testing and product certification by the SunSpec Alliance. The certification program includes governance, test procedures, software, and the test facility certification procedures. Detailed certification procedures against specific standards, such as CSIP/2030.5, are also described.

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## About the SunSpec Alliance

The SunSpec Alliance is a trade alliance of developers, manufacturers, operators, and service providers together pursuing open information standards for the distributed energy industry. SunSpec standards address most operational aspects of PV, storage, and other distributed energy power plants on the smart grid, including residential, commercial, and utility-scale systems, thus reducing cost, promoting innovation, and accelerating industry growth.

Over 100 organizations are members of the SunSpec Alliance, including global leaders from Asia, Europe, and North America. Membership is open to corporations, non-profits, and individuals. For more information about the SunSpec Alliance, or to download SunSpec specifications at no charge, visit [sunspec.org](https://sunspec.org).

## About the SunSpec Specification Process

SunSpec Alliance specifications are initiated by SunSpec members to establish an industry standard for mutual benefit. Any SunSpec member can propose a technical work item. Given sufficient interest and time to participate, and barring significant objections, a workgroup is formed and its charter is approved by the board of directors. The workgroup meets regularly to advance the agenda of the team.

The output of the workgroup is generally in the form of a SunSpec Interoperability Specification. These documents are considered to be normative, meaning that there is a matter of conformance required to support interoperability. The revision and associated process of managing these documents is tightly controlled. Other documents are informative, or make some recommendation with regard to best practices, but are not a matter of conformance. Informative documents can be revised more freely and more frequently to improve the quality and quantity of information provided.

SunSpec Interoperability Specifications follow a lifecycle pattern of: DRAFT, TEST, APPROVED, and SUPERSEDED.

For more information or to download a SunSpec Alliance specification, go to <https://sunspec.org/about-sunspec-specifications/>.

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# 1 Introduction

This specification describes policies and mechanisms for independent testing and product certification specified by the SunSpec Alliance.

Benefits of the SunSpec Alliance certification program include:

- Differentiation between compliant and non-compliant implementations.
- Cost savings and shorten product implementation times.
- Assurance of consistency and quality in interoperable smart grid systems and devices.
- Registration of certified products.
- Certification of DER conformance, inspection, and accreditation.
- Auditing to ensure testing program quality.
- Legal and operational assurance for testing & conformity assessment programs

A SunSpec Alliance certification program based on accepted testing and certification standards and recommendations.

The certification program structure described in this document applies to products for which manufacturers seek SunSpec certification.

## 1.1 Background

The NIST SGIP Smart Grid Testing & Certification Committee (SGTCC) published an Interoperability Process Reference Manual (IPRM) that recommends processes and best practices for introducing interoperable smart grid products. The recommendations build on international interoperability testing and certification standards and include a recommendation to implement an Interoperability Testing and Certification Authority (ITCA) in support of each smart grid standard. An ITCA implements IPRM best practices to facilitate long term interoperability improvements and provide consistency between test laboratories and certification bodies.

An ITCA is responsible for developing and maintaining the Certification Program Requirements (CPRs) and best practices. CPRs cover all aspects of product and system certification for interoperability specified in applicable standards and profiles referenced by the CPRs. The ITCA should define use cases and testing requirements in a testing and certification standard document, for both conformance and interoperability, as applicable. Any organization may become an ITCA by developing and maintaining a certification program.

## 1.2 Purpose

This document specifies a certification program that includes governance, test procedures, software, and the test facility certification procedures.

Manufacturers can use this specification to learn about product certification and associated governing policies and procedures. Test laboratories can use this specification to understand the requirements to qualify as an Authorized Testing Laboratory (ATL), and the process for performing certification testing.

## 2 General References

ISO 17000:2004; *Conformity assessment -- Vocabulary and general principles.*

ISO/IEC 17011:2004; *Conformity assessment -- General requirements for accreditation bodies accrediting conformity assessment bodies.*

ISO/IEC 17025:2017; *General requirements for the competence of testing and calibration laboratories.*

ISO/IEC Guide 65:1996; *General requirements for bodies operating product certification systems.*

ISO/IEC Guide 67:2004; *Conformity assessment -- Fundamentals of product certification.*

ISO/IEC 17065:2012; *Conformity assessment -- Requirements for bodies certifying products, processes and services.*

ISO/IEC 17067:2013; *Conformity assessment -- Fundamentals of product certification and guidelines for product certification schemes.*

ISO/IEC 17021:2011; *Conformity assessment - Requirements for bodies providing audit and certification of management systems.*

ISO/IEC 17024:2012; *Conformity assessment -- General requirements for bodies operating certification of persons.*

ISO/IEC 17050-1:2004; *Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements.*

ISO/IEC 17050-2:2004; *Conformity assessment — Supplier's declaration of conformity — Part 2: Supporting documentation.*

NIST Special Publication 1108; *NIST Framework and Roadmap for Smart Grid Interoperability Standards*, Release 1.0; January 2010.

NIST Smart Grid Testing & Certification Committee (SGTCC); *Interoperability Process Reference Manual*, version 2.0; January 2012.



## 3 Nomenclature

### 3.1 Terminology

Accreditation	<p>3rd party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks.</p> <p>Third-party attestation related to a conformity assessment body conveying formal demonstration of its competence to carry out specific conformity assessment tasks. (ISO/IEC 17000:2004)</p>
Accreditation Body	authoritative body that performs accreditation (ISO/IEC 17000:2004)
Accrediting Body	Organization that formally evaluates processes of test laboratories or certification bodies with respect to specific standard(s) or specification(s).
Application Profile	A selected subset of the product and / or standard which can be used to implement a particular feature set or use case scenario.
Attestation	Issuance of a statement that fulfillment of specified requirements has been demonstrated. (ISO/IEC 17000:2004)
Certificate	Unique identifier of a particular product. It applies to both software and hardware products. The certificate can be a physical or digital artifact (e.g., X.509 PKI schemes require digital certificates).
Certification	Third-party attestation related to products, processes, systems or persons.
Certification Body	The entity responsible for certifying that products have fulfilled the requirements of a standard or specification.
Certification Program	<p>product certification system related to specific products to which the same specified requirements, specific rules and procedures apply.</p> <p>This is used to refer collectively to the set of operating procedures, policies, roles and responsibilities that make up the Wi-Fi Alliance certification operation.</p>
Certification System	<p>rules, procedures and management for carrying out 3rd party product conformity assessment</p> <p>An online tool used to track all certification related activities as well as to maintain all completed certification records.</p>

	The system may be accessed from <a href="https://certifications.wi-fi.org/">https://certifications.wi-fi.org/</a> and requires proper credentials.
Compliant Portion Description	<p>CPD is a definitive manifest of all mandatory and optional features implemented in a certified product. The CPD is generally used by product designers to judge:</p> <ul style="list-style-type: none"> <li>• Conformance of an implementation</li> <li>• Completeness of a system composed of pre-certified sub-components by comparing each of the CPDs of those sub-components.</li> </ul>
Conformance Certification	A third-party attestation that a product conforms to a standard or specification.
Conformance Testing	Determines whether an implementation conforms to the standard as written. This is done by evaluating the implementation with a test tool such as an emulator, test harness, golden unit, etc.
Conformity Assessment	demonstration that specified requirements relating to a product, process, system, person or body are fulfilled (ISO/IEC 17000:2004)
Conformity assessment body	body that performs conformity assessment services
Device	A physical object that performs a set of functions. Examples are inverters, trackers, and modules.
Equipment Under Test	The system or device implementation subject to testing.
Feature set	feature set is a particular characteristic of a product based on a particular use case scenario. For example: signaling price is a feature set.
First Party Testing	when an implementer self-tests their own product. This is usually permitted after a technology has matured to where sufficient tools and specifications enabling first party testing are available to all vendors.
Golden Implementation	Test tools that can be configured in a laboratory to provide a constant baseline or reference such that there is assurance that changes to the products making up a system under test or configuration variants are consistently tested in the same manner
Interoperability	Ability of a product or system to work with or integrate with another product or system based on defined business requirements.
Member	Members (Contributor, Sponsor, Affiliate, or Implementer) are companies that complete a number of requirements, including conformance to a Membership Agreement and an Intellectual Property Rights Policy, as well as an annual

	Membership Fee, and remain in good standing with the Alliance for the period of their membership.
Profile	define conforming subsets or combinations of base standards used to provide specific functions. Profiles identify the use of particular options available in the base standards, and provide a basis for the development of uniform, internationally recognized, conformance tests. [ISO/IEC TR 10000-1:1998]
Security Testing	Analyzes whether the implementation correctly makes use of any security features from the standard or other security features available in the product. This is the most difficult type of testing program since it must evaluate whether the system has vulnerabilities, which are not always obvious.
Static Conformance Review	A review of designed feature sets versus the specified PICS to determine the extent to which the features are supported by the IUT. This is the first step when a product enters a testing program. Generally the test lab requests that the implementer declare all supported feature sets in a product. This information is used to create the test plan for that product.
Test Cases	set of tests to verify a particular feature set. There are many ways to test a feature set, with each of those representing a test case. Generally, a program defines all possible test cases in the test specification document.
Test Case Reference List	A current master list of all tests that are to be included into a product test plan. This list also indicates the time variable applicability of each test by reflecting those tests which are no longer valid, and those that are not currently valid but are scheduled to become active in the near future. This helps a product implementer in preparing fully conforming and interoperable products for an upcoming launch.
Test Harness	Collection of software, test data, and hardware configured to test a product by operating it under varying conditions and monitoring its behavior and output.
Test Interface	The programmatic application interface to enable communication between a test harness and system or device under test.
Test Plan	A Test Plan is a list of applicable tests for a specific product and is derived from the Test Case Reference List.
Test Procedure	A stepwise test method of a particular test case. An example of a test procedure can be the steps needed for an Energy Services Interface (ESI) to send price signals, which may include configuring the time information, updating price tables, etc.

Test Profile	A select subset of a product and / or standard to implement a particular test of a feature or a use-case test. Test Profiles evaluate a subset of a TSS and are used to target specific areas of product interoperability.
Test Resource	Any information, equipment, material, and support required to implement testing.
Test Suite	A collection of related test cases. A test suite can be put together to test a feature set. A pricing test case would be in a “price test suite” but a messaging test case would be in a “messaging test suite”.
Test Suite Specification	Consists of a suite of tests, categorized into logical functional areas, such as use cases or well-defined features. Each test suite consists of many related test cases corresponding to a particular feature set or use case. Test cases would include both valid and invalid behavior tests. Each test case is further described step-by-step with test procedures and well defined pass / fail / indeterminate criteria, along with references.
Testing	According to EN 45020, testing is defined as “the technical operation that consists of the determination of one or more characteristics of a given product, process or service according to a specified procedure”.
Testing Laboratory	Test service provider for a standard or specification.
Third Party Testing	Testing activities performed by organizations independent of first or second parties.
Use Case	A description of a system’s behavior as it responds to a request that originates from outside of that system

## 3.2 Acronyms

Acronym	Meaning
ATL	Authorized Test Laboratory
CA	Certification Authority
CB	Certification Body
CID	Certification Identification
CPR(s)	Certification Program Requirement(s)
CSIP	Common Smart Inverter Profile
DDERC	Default DER Control
DER	Distributed Energy Resources
DERC	DER Control
DERP	DER Program
EUT	Equipment Under Test
EXI	Efficient XML Interchange
GFEMS	Generating Facility Energy Management System
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IOU	Investor-Owned Utilities
EPRI	Electric Power Research Institute
IPRM	Interoperability Process Reference Manual
ITCA	Interoperability Testing and Certification Authority
LFDI	Long Form Device Identifier
MCA	Manufacturer's Certification Authority
MICA	Manufacturing Issuing Certification Authority
NIST	National Institute for Standards and Technology
OOB	Out-of-band
PEV	Plug-in Electric Vehicle
PICS	Protocol Implementation Conformance Statement

PF	Power Factor
PV	Photovoltaic
RFC	IETF Request for Comments
SEP	Smart Energy Profile
SEPA	Solar Electric Power Association
SERCA	Smart Energy Root Certification Authority
SFDI/sFDI	Short Form Device Identifier
SGIP	Smart Grid Interoperability Panel
SGTCC	Smart Grid Testing & Certification Committee
SMCU	Smart Inverter Control Unit
TCP/IP	Transmission Control Protocol/Internet Protocol
TL	Test Laboratory
TLS	Transport Layer Security
UDP	User Datagram Protocol
UL	Underwriters Laboratories
URI	Uniform Resource Identifier
WADL	Web Application Description Language
XML	Extensible Markup Language

## 4 Certification Overview

The SunSpec Alliance ITCA intends this certification program to certify the interactions and expectations of the DER manufacturer, test laboratory (TL) and certification body (CB). Its business structures are open and inclusive, non-discriminatory with regards to participation, and without restrictive conditions on test specification availability. This promotes broad industry engagement in implementing interoperable systems, while recognizing business needs to maintain a financially sustainable testing and certification program.

The SunSpec Alliance ITCA derives policies, procedures, and best practices from the ISO/IEC 17025 standard and ISO/IEC Guide 65.

The ISO/IEC 17025 standard applies to test laboratories and requires that laboratories demonstrate a quality management system, technical competence, and generate technically valid results.

ISO/IEC 17025 focuses on the following laboratory operations areas:

- Management requirements:
  - Documented practices
  - Impartiality
  - Continuous improvement and issues resolution
  - Support and involvement of lab management in assuring compliance
- Technical requirements:
  - Staff competence in performing their testing duties
  - Environment sufficiency for services performed
  - Availability of documented test plans and operating instructions
  - Maintenance and calibration of equipment and software used for testing, and appropriateness for intended use

ISO/IEC Guide 65 applies to certification bodies and reflects many of the concepts described in the ISO/IEC 17025 standard:

- assure that the organization is non-exclusionary, open and without conflict of interest.
- documented administrative policies and processes
- documented technical requirements and specifications for certification
- assure that procedures are in place to describe the granting of certifications
- procedures for ongoing maintenance, extensions and terminations of certifications
- Personnel qualifications

The ITCA certification scheme specifies rules, procedures, and management requirements for performing third-party product conformity assessment. The scheme ensures program quality by:

- Providing a detailed agreement between stakeholders about how a conforming standard must be implemented. This is called a Protocol Implementation Conformance Statement (PICS) document.

- Providing rigorous and independent verification that the claimed conformance exists. This is provided by independent testing by qualified 3<sup>rd</sup> party test laboratories.
- Ensuring that certified products are re-certified when major updates are made and that the updates are conformant and certified.
- Ensuring that certification test tools are of commercial quality and available to vendors for pre-certification testing.

After successful certification, a DER product is SUNSPEC CERTIFIED™. The SUNSPEC CERTIFIED™ program provides a widely-recognized designation of interoperability and quality, and it helps to ensure that products that implement the IEEE 2030.5 standard deliver the best user experience.



## **5 General Concepts**

### **5.1 Required Level of Testing**

The applicable test requirements describe the level of testing essential for a device under test to be considered conformant.

#### **5.1.1 Thoroughness of testing**

The SunSpec Alliance engages industry experts to provide technical expertise for assessing certification program completeness. Additionally, regular audits of the certification program provides for iterative improvements as knowledge is developed during program operation.

#### **5.1.2 Testing Gap Mitigation**

It is possible that the test plan might not fully test some areas of the standard, depending on the level of testing.

The certification process seeks to mitigate testing gaps by tracking issues and establishing corrective action procedures, and cooperative engagement between standards development organizations and testing organizations.

### **5.2 Results Consistency**

To promote confidence in the certification program, tests of an agreed upon test program must be repeatable and the results must be consistent among all certified testing laboratories.

### **5.3 Traceability**

ISO 17025 requires that a laboratory has in place a calibration system to ensure that, within known limits of uncertainty of measurement, any tests or calibrations which it makes are comparable with those of any other laboratory. The key element in achieving this is to ensure that all equipment, in all laboratories, that impact the validity of tests is calibrated in such a manner that there is an unbroken chain of comparisons which leads from the equipment to a recognized standard of measurement.

### **5.4 Golden Test Tools**

Successful testing programs assure that there is a known reference or constant to which the system is evaluated against the desired metrics to determine conformance. Test and certification programs that are performed across multiple test facilities implement processes to assure they are each measuring against a common known reference to achieve repeatable results regardless of location. Test tools require validation processes, test suites, documentation, test reports, calibration certificates and other relevant artifacts.

A common practice is to use reference hardware and software test tools that provide a consistent and replicable approach in generating test results. One term for describing such a test tool is common test harness.

A common test harness is an automated software-based test tool designed to test a particular system under specified conditions. Using such a tool, comparative results can be generated in which the tool provides the consistency and the effects of changes in the EUT can be evaluated.

Golden test tools refer to laboratory test tools that provide a constant reference and ensure that changes to the EUT or configuration variants are consistently tested in the same manner and permit comparative results generation against a known standard.

## 6 Certification Authority Governance and Policies

Principle stakeholder organizations have a primary role in ensuring interoperability is achieved. The key organizations and a description of their roles and responsibilities relative to Smart Grid testing and certification is provided in this section.

Testing and conformance require standards and standardized test methods and processes to assure consistent and repeatable results. Conformance to a standard and testing require a clear definition of what conformance means relative to a specific standard or test program. Standards organizations, or a designated testing authority, are responsible for establishing these conformance criteria.

Enabling the desired levels of Smart Grid system/device conformance and certification requires certification standards developers to facilitate clarification and interpretation of existing standards as they transition to testing programs.

The certification standards organization needs to incorporate the necessary information to allow a seamless transition from standard to conformance testing.

Technical requirements/best practices for the ITCA are specified to assure technical depth and sufficiency for:

- explicit and transparent information on program requirements, processes, metrics, and specific test environments
- detailed documentation, including procedures, profiles, results, product versions, and constraints
- validated and traceable test tools and software
- qualitative evidence of interoperability, where lack of reported problems or anecdotal information is insufficient

### 6.1 Organizations

#### 6.1.1 Testing & Certification Authority

The SunSpec Alliance is the interoperability testing and certification authority (ITCA). The ITCA provides:

- Detailed CPRs
  - Testing laboratory (TL) requirements, including test suite specifications
  - Certification body (CB) requirements, including certificate control and surveillance of certified products
  - Forms, records, and reports format definition
- Expertise
  - Technical resource for TL and CB accreditation body assessment
  - Consistency between TLs, and between CBs
  - Feedback to standard setting organization

### 6.1.2 Certification Body

The CB implements a certification program that ensures uniform and transparent procedures are established for evaluating test labs. This includes defining the qualifications required for personnel involved in certification and testing processes.

The SunSpec Alliance owns the Certification Program has final authority for approval of SUNSPEC CERTIFIED™ products under the certification program.

The CB must be accredited to ISO Guide 65, General Requirements for Bodies Operating Product Certification Systems, which specifies that the CB shall:

- Establish a management system
- Promote cooperation and collaboration between organizations to address testing and certification needs and criteria for technical scenarios when the integration of multiple standards impacts on enabling interoperability.
- Maintains all program records and executes all program policies as specified by the ITCA CPRs

Key CB products are:

- Testing architecture
- Lab qualification requirements
- Best practices
- Product testing guide
- High-profile branding

### 6.1.3 Hardware and Software Vendors

The testing and certification program implies that hardware and software system devices are subjected to testing and analysis as a condition of deployment. As such, these vendors must proactively self-assess that they are designing and producing their products in accordance with the specified standards, and assure that they perform internal testing and evaluation to succeed in meeting conformance expectations before certification testing. Voluntary certification program participation provides confidence to end users and regulators that vendors are proactively working to assure interoperability.

With depth of test experience, product performance knowledge, and domain expertise, vendors are an important contributor to the development and implementation of test and certification programs. Vendors can help assure that the test programs are robust and comparable across their own product line as well as products of other vendors. Vendors are expected to follow the standards, and to describe which features the product supports and to what level, using the PICS.

The CPR encourages vendors to take a rigorous approach in internal assessments to minimize the likelihood of non-conformances when subjected to independent assessment.

Both SunSpec Alliance members and non-members who want to obtain certification shall follow the steps described in this document, and shall follow all relevant ITCA policies.

#### 6.1.4 Authorized Testing Laboratories

Authorized Testing Laboratories (ATLs) develop and implement test procedures and equipment to ascertain standard conformance of the vendor product.

ATLs operate as independent testing facilities and must be accredited to ISO 17025, General Requirements for the Competence of Testing and Calibration Laboratories.

ITCA policy requires independent, third party testing, and designates and oversees authorized laboratories to ensure:

- laboratory technical capability
- adherence to laboratory quality standards
  - establishes hardware and software calibration processes
  - uses and controls test plans
  - provides staff training
- assurance of no conflict of interest concerns
- availability of test equipment
- qualification of testing staff
- standards familiarity
- financial stability

## 6.2 Qualification

CBs and TLs are required to be third-party accredited to ISO/IEC Guide 65 and ISO/IEC 17025, respectively.

The SunSpec Alliance qualifies and authorizes ATLs to perform test activities on behalf of the SunSpec Alliance. As a part of the qualification process, the SunSpec Alliance trains ATL personnel on test procedures and relevant policies and requirements.

Program training includes:

- administration
- test plan requirements and tests
- program administration
- quality standards

In managing multiple laboratories, the ITCA shall avoid quality differences and ensure test repeatability between laboratories.

Each ATL shall ensure that test equipment conforms to the SunSpec Alliance technical specifications. In conducting certification testing, the ATL shall ensure:

- staff competence
- test equipment and setup suitability for
  - testing
  - registration
  - recording

- reporting

Only SunSpec Alliance members and non-members in good standing may submit products to ATLs for testing or certification.

### **6.3 Audit Requirements**

To ensure continuous testing and certification program improvement, the ITCA includes monitoring and auditing procedures to:

- ensure adherence to its policies
- audit ATLs at appropriate intervals to ensure laboratories uphold necessary capabilities
- ensure product conformance is maintained after product certification
- provide feedback to standards committees and other stakeholders

### **6.4 Test Tools**

Test tools must produce reliable, repeatable, and traceable test results. Test tools require:

- validation processes
- test suites
- documentation
- test reports
- calibration certificates

Test tool validation must be performed against a defined sample of software and hardware implementations under test, as described in the ISO/IEC 17025 standard.

### **6.5 Test Laboratory Information**

Information used routinely in ATL operations shall be made available by the ATLs to the SunSpec Alliance for posting on the SunSpec Alliance web site.

ATLs shall provide the SunSpec Alliance all required information regarding how vendors interface with the ATL to facilitate product testing. This information includes:

- Contacts
- Cancellation and postponement policies
- Terms
- Web sites and links

Administrative and operational activities between vendors and the ATL include:

- scheduling
- equipment delivery
- on-site testing
- reporting
- approvals
- ad hoc communications

## 6.6 Certification Artifacts

Record handling and retention requirements shall be consistent with ISO 17025 and ISO Guide 65 requirements.

### 6.6.1 Application for Certification

An application for certification provides all of the information needed to begin the certification process.

An item contained in the application for certification is the Protocol Implementation Conformance Statement (PICS) for the product being certified. The PICS states the products conformance to specific test procedures associated with the certification being requested. Each certification program has a specific PICS format.

### 6.6.2 Test Assessment

Each test case has a defined a set of prerequisites, a test scenario consisting of a sequence of message exchanges, and an expected result. Execution of a test scenario results in payload exchanges between the device under test and the Test Harness.

Test success or failure is determined by meeting the pass/fail criteria described in the test plan.

### 6.6.3 Test Reports

Final Test Reports should minimally include:

- organization(s) that conducted the tests and location(s) where the tests took place
- test completion date
- product identifier:
  - name
  - version
- type of tests performed
- test script version information
- standard(s) version information
- technique(s) used for testing, including applicable standards and procedures
- test profile used
- test equipment used, including equipment traceability statements.
- Where constraints are identified, details on the extent, conditions, and limitations

### 6.6.4 Issue Tracking and Resolution

A mechanism shall be established for tracking issues related to product certification and their resolution.

### 6.6.5 Conformance Certificate

Conforming products shall receive the SUNSPEC CERTIFIED™ mark to indicate the product meets SunSpec Alliance certification requirements.

Conformance certification includes:

- Certified marks license agreement
- Use of the certified mark
- Certified marks style guide

#### **6.6.6 Certified Product List**

The SunSpec Alliance maintains a list of certified products on the SunSpec Alliance web site.

### **6.7 Corrective Process**

A corrective process shall be established for addressing grievances and issues related to a products failure to meet certification requirements.

### **6.8 Changes to a Certified Products**

Procedures shall be established to re-certify a product when changes are made to the product after the initial product certification.



## 7 Common Smart Inverter Profile (CSIP)/2030.5 Certification Program

The Common Smart Inverter Profile (CSIP) certification program is based on the test procedures specified in the SunSpec Common Smart Inverter Profile (CSIP) Conformance Test Procedures specification.

The certification program can be applied to DER clients, DER aggregator clients, and utility servers.

Certification testing includes some of the following areas:

- Connectivity
- Configuration
- Security
- Basic functionality
- Utility server aggregator model
- Utility server aggregator operation
- Error handling
- Model maintenance

The test procedures document establishes a common set of tests to verify conformance with the IEEE 2030.5 standard as specified in the CSIP. Verification of compliance of a certain device or equipment under test (EUT) involves determining EUT receipt and understanding of communications requests and the generation of appropriate responses. Communications testing verifies that the EUT can process inputs received in a standard communications format.

CSIP addresses the communications path between the utility and the Aggregator, the utility and a Generating Facility Management System (GFEMS), and the utility and the Smart Inverter Control Unit (SMCU). Communications between the Aggregator/GFEMS and its managed DERs or communications within the DER are out of scope.

### 7.1 CSIP/2030.5 References

IEEE 2030.5; *Draft Standard for Smart Energy Profile Application Protocol*.

Common Smart Inverter Profile Working Group; *Common Smart Inverter Profile, IEEE 2030.5 Implementation Guide for Smart Inverters*, Version 2.0; March 2018.

SunSpec Alliance; *SunSpec Common Smart Inverter Profile (CSIP) Conformance Test Procedures*, version 0.9; January 31, 2018.

SunSpec Alliance; *SunSpec Common Smart Inverter Profile (CSIP) Protocol Implementation Conformance Statement (PICS) Template*, pending.

### 7.2 Product Certification Submission

The CSIP/2030.5 certification program requires the following inputs:

- Application for certification
- PICS

### **7.2.1 Application for Certification**

The certification process begins with an application for certification made to the certifying agency. The application should contain a PICS for the equipment being testing, including any information required by the certifying agency.

### **7.2.2 PICS**

The submitted Protocol Implementation Conformance Statement (PICS) should conform to the format and content of the SunSpec Common Smart Inverter Profile (CSIP) PICS Template.

The PICS states the type of device being submitted for certification:

- Server
- Aggregator
- Client

The PICS also states the conformance to each of the applicable testing categories as specified in the PICS template and any deviation to conformance related to the required functionality.

## **7.3 Certification Testing**

Certification testing is performed by the certifying agency using the test procedures specified in the SunSpec Common Smart Inverter Profile (CSIP) Conformance Test Procedures specification.

## **7.4 Product Certification Results**

The certifying agency administering the CSIP/2030.5 certification program produces the following outputs:

- Test assessment
- Test report
- Issue tracking and resolution

### **7.4.1 Test Assessment**

A test assessment is provided that describes the success or failure of a device in meeting certification requirements. If a device fails certification, the assessment outlines necessary corrective action.

### **7.4.2 Test Report**

A detailed test report lists the results of each test against the test procedures input.

### **7.4.3 Issue Tracking and Resolution**

Issues related to certification testing and their resolution status are tracked, and their resolution status is updated.

## **7.5 SunSpec Alliance Results Reporting**

On successfully completing certification, the SunSpec Alliance issues a certificate of compliance for the equipment and adds the certification information to the [SunSpec Certified Products Catalog](#).