

**PRODUCT ASSURANCE  
PROGRAM  
2018 ANNUAL REPORT**



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## CLEAN ENERGY COUNCIL

**The Clean Energy Council is the peak body for the clean energy industry in Australia. We represent and work with hundreds of leading businesses operating in solar, wind, energy efficiency, hydro, bioenergy, energy storage, geothermal and marine along with more than 6000 solar installers.**

The Clean Energy Council (CEC) delivers a wide range of services to its members, installers, retailers and the broader clean energy industry with the aim of growing the sector in the interests of all Australians. As part of this, we provide co-regulatory services through industry accreditation and assurance programs, ensuring the safety and quality of Australian solar and energy storage systems.

### **Accredited Installers**

The Clean Energy Council administers an accreditation program for installers, involving pre-requisite training, provisional accreditation, full accreditation and continuous professional development. It maintains installation guidelines and manages dispute procedures as part of that accreditation program.

### **Approved Solar Retailers**

The Clean Energy Council also manages the Solar Retailer Code of Conduct, a voluntary code designed to raise standards in the solar industry. The Approved Solar Retailer scheme is authorised by the Australian Competition and Consumer Commission and aims to lift the bar higher than the minimum requirements set by government and regulations, and bring about a better standard of service in the solar industry.

### **Product Assurance**

Through its Product Assurance program, the Clean Energy Council verifies and tests solar and storage products that are eligible to be installed in Australia, based on their compliance with Australian and International Standards. The CEC works in collaboration with government, electrical safety regulators, certifiers, network providers and product manufacturers to ensure that only approved product is installed in the Australian market.

# PRODUCT ASSURANCE PROGRAM

## 1.1 WHAT IS THE PRODUCT ASSURANCE PROGRAM?

The Clean Energy Council (CEC) maintains listings of products that are eligible to be installed, based on their compliance with Australian and International Standards. Only these listed products have access to financial incentives available under the federal government's Small-Scale Renewable Energy Scheme (SRES).

A number of state government programs also require installed products to be approved by the CEC in order to participate.

The Clean Energy Council's approved products lists are for:

- Inverters and power conversion equipment - inverters and power conversion equipment compliant with relevant Australian and International standards. This list is also used by some distribution network service providers to validate inverter energy system applications.
- Solar PV modules - AS/NZS 5033 – compliant photovoltaic (PV) modules.
- Energy storage devices (ESD) – includes lithium based ESDs compliant with the Best Practice Guide: Battery Storage Equipment – Electrical Safety Requirements

In conjunction with the product approval lists, the CEC also runs a testing and compliance program. This encompasses proactive internal audits of the database of approved products and their relevant certifications and targeted product testing. Where possible the testing sources product via blind buying and then ships them to independent test labs throughout Australia and overseas

The CEC has authority to reject an application to list a product and to de-list a product that ceases to comply with the relevant terms and conditions of listing.

Under the terms and conditions for listing, an affected company has a right to refer any such decision of the CEC to the Product Listing Review Panel.

The [Product Listing Review Panel](#) is an independent panel with industry and consumer representation and is responsible for hearing appeals against decisions made by the CEC.

The CEC maintains a log of reported product complaints, including reports through the PV system fault reporting portal on the [solaraccreditation.com.au](http://solaraccreditation.com.au) website.

The product test program was developed after persistent reports to CEC of non-compliant products and products failing prematurely. This originally encompassed PV module testing, which began in 2014. In late 2017, inverter testing was added to the program.

The program has initially been run as a targeted program, with product selection based on a risk analysis and on the log of failure reports from the market. The cost of the program is funded through the product listing application fees.

## 1.2 PROGRAM GOVERNANCE

### Regulatory framework

The regulatory framework for the Australian solar industry has been developed over more than a decade. It encompasses the work of the Clean Energy Council (CEC), Clean Energy Regulator (CER), state-based electrical bodies, national and state-based consumer protection bodies, distribution network service providers (DNSP) and Standards Australia.

Use of the CEC approved products is required under the Renewable Energy (Electricity) Regulations 2001 used to govern the federal Small-scale Renewable Energy Scheme (SRES). A number of State governments also require systems to use CEC approved products in order to qualify for their rebates.

This currently includes the Solar Victoria Solar Homes Package and South Australia's Home Battery Scheme.

Use of CEC approved inverters is also listed as a requirement for connection for the following Australian DNSPs:

ActewAGL	Essential Energy
Ausgrid	Power and Water Corporation
Ausnet Services	SA Power Networks
Citipower/Powercor	TasNetworks
EnergyQLD	Western Power

### The Product Listing Review Panel

The Product Listing Review Panel is an independent panel with industry and consumer representation. It is responsible for hearing appeals against decisions made by the CEC to refuse to list or to de-list a product. The Panel meets regularly to ensure the product listing scheme is operating effectively and is meeting the identified objectives.

The Panel arose out of a need to provide an independent means of appeal for companies whose products have been de-listed or refused listing by the CEC. The Panel was established in 2016 following some comprehensive changes to product listing procedures implemented by the CEC.

A company may appeal against a decision by sending an email request to the Product Manager at [products@cleanenergycouncil.org.au](mailto:products@cleanenergycouncil.org.au). Appeals must be lodged within five Victorian business days of the CEC informing the industry of the proposed de-listing.

The Panel will then meet to go through all information provided by both the CEC and the appellant to determine whether the CEC has acted within the requirements set in the terms and conditions of the program, and if there is any reasonable case to alter the requirements.

The Panel's decision is final, and notices of the decision are published on the [solaraccreditation.com.au](http://solaraccreditation.com.au) website.

The panel does not have the authority to overrule requirements set out in Australian or International Standards.

More information on the Panel can be found at [solaraccreditation.com.au/products/product-listing-review-panel](http://solaraccreditation.com.au/products/product-listing-review-panel)

## PV MODULES

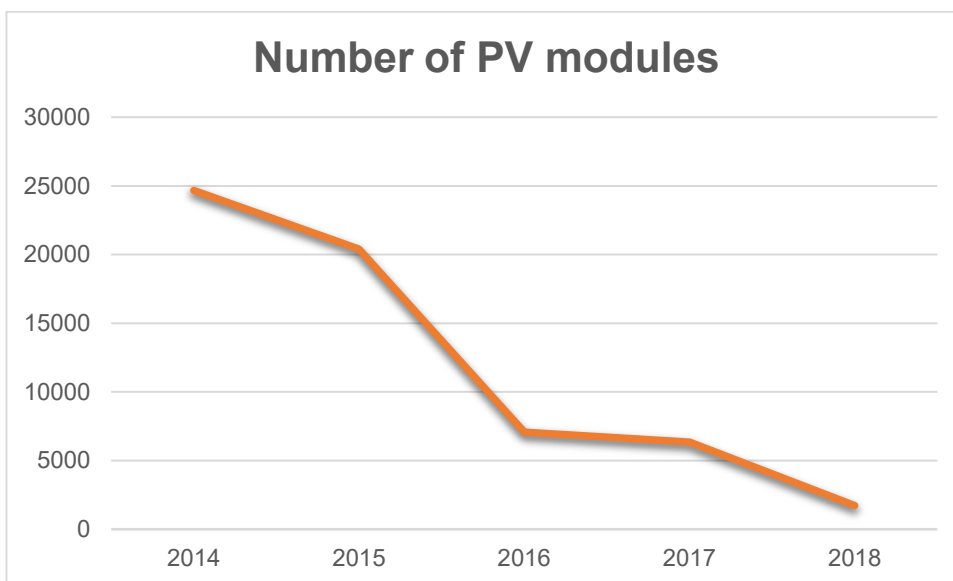
### 2.1 PV MODULE APPROVAL

The Clean Energy Council maintains the database and website listing of AS/NZS 5033-compliant photovoltaic (PV) modules. This standard is called up by AS 3000, which is legislated in each state and requires that modules shall be compliant with the International Electrotechnical Commission's (IEC) IEC 61730 and IEC 61215.

The certificates required for listing must be issued by a national certifying body (NCB) who is accredited to certify PV module testing under the IECEE CB scheme. Module testing must be performed by a test laboratory associated with the NCB and approved to test PV modules to these standards under the IECEE scheme.

The CEC only accepts certificates where periodic factory inspections are carried out by the certifying body. This is to ensure ongoing compliance with the international standards.

From 1 December 2018, all PV modules listed with the CEC were required to show compliance to the 2016 versions of IEC 61730 and IEC 61215. This also requires that modules are Fire Class C per UL790 under IEC 61730 certification.



The new standards place greater emphasis on safety aspects related to protection against electric shock, as well as fire hazards. The mechanical robustness of the junction box, its cables and connectors are verified separately.

## 2.2 ENHANCED LISTING

While the CEC's approved PV module list requires compliance with AS/NZS5033 – and its related international standards – this only represents the minimum level of compliance allowed to enter the market.

Enhanced listing offers manufacturers the opportunity to show where their product has been tested to higher requirements. The CEC will show those modules which meet these standards on the CEC Approved Products list if it is demonstrated that all materials for that model number are covered by the enhanced certification.

The following testing programs and additional environmental testing standards are included in the CEC's enhanced listing options and give consumers and installers more information on the quality of the modules they are looking to install.

### Quality certification

#### VDE Quality Tested

This certification program has been developed to provide assurance of increased reliability and durability of modules. Along with quarterly laboratory testing of a sample of production modules, it also requires production line sample testing on a daily basis, with some tests required for 100 per cent of production.

#### IEC 62941

International Electrotechnical Commission's IEC 62941 Guidelines for increased confidence in PV module design qualification and type approval. This IEC standard was released in January 2016. Certification to this standard gives a high degree of confidence that the modules will meet their claimed warranty lifetime.

### Special environment testing

For particular environments it is advised to seek certification to additional standards. These include:

- coastal environments – your modules should be certified to IEC 61701 for salt mist corrosion
- intensive farming sheds – certified to IEC 62716 for ammonia corrosion
- commercial systems above 600 VDC – certified to IEC 62804 for potential induced degradation
- cyclonic regions – we recommend module and framing assembly should be tested by the cyclone testing station at James Cook University
- desert regions – certified to IEC 60068-2-68 wind-blown dust and sand
- snow regions – certified for snow load of 5400 Pa or higher (per IEC 61215 enhanced

test)

The important thing to note is that a manufacturer's datasheet may advertise the modules are certified to an enhanced standard. However, it may be that not all the materials permitted by the IEC 61215/61730 certification may have been tested for the enhanced certification.

The best way to be sure you are getting what you require is to negotiate with your supplier for the actual components they will be using in your modules, and ensure these component combinations meet the enhanced standards, as well as the base AS/NZS 61215/61730 standards.

## 2.3 SOLAR PANEL VALIDATION INITIATIVE

Throughout 2018, the Clean Energy Council continued to work with the Clean Energy Regulator (CER) and others in the solar industry to promote and support the roll out of the Solar Panel Validation (SPV) initiative.

The initiative, launched at the All-Energy Australia 2018, was developed to ensure genuine solar panels are installed in Australia and to address the installation of unapproved solar panels in the Small-scale Renewable Energy Scheme.

This is done by using an app to scan solar panel serial numbers prior to installation. These are then checked against a database of verified serial numbers that have been provided by approved solar panel manufacturers.

The CEC supports this program by capturing serial number formats of manufacturers, as well as registered importers, permitted factories and labels, and making this information available to the CER and the SPV initiative partners.

## 2.4 TESTING AND COMPLIANCE

The PV module testing and compliance program is aimed at improving the quality and integrity of PV modules on the CEC approval list. The CEC purchases selected devices from the Australian market on the basis of risk-based profiling and has them tested at a number of testing laboratories.

The objective of this testing is to confirm the safety and compliance of the devices with the relevant product standards, the certification for that device and the CEC's terms and conditions for listing products.

The independent testing program is funded through the product listing application fees.

### Internal compliance audits

As part of the quality assurance processes, the CEC's technical specialists also conduct internal audits on products listed with the Clean Energy Council. These internal compliance checks include:



- ensuring manufacturer and importer details are current
- reviewing manufacturer and importer websites for appropriate consumer documentation
- following up on claims of warranty non-response
- reviewing documentation, including certificates, for validity and currency.

### Independent testing

The primary methodology for testing is purchase of new modules from the market, either direct or by purchase agents and evaluation of a basic range of checks.

Modules are selected for testing based on a risk assessment matrix and is targeted at the low end of market. Primary inputs to the matrix are through complaints received by the CEC, the PV System Fault Reporting Portal maintained by Murdoch University, and internal reviews of the CEC listing.

A priority list of manufacturers is maintained for scheduling of future testing. These are checked for currency on the CEC list, currency of IEC certification and availability in Australia.

### 2018 Testing and compliance summary

In 2018 the CEC undertook 50 compliance investigations, with 78 per cent of these being generated from internal audits and our testing program. The main issues identified were:

• Invalid certificate	24%
• Certificate misuse/material substitution	22%
• Not available for testing	14%
• Other testing issue/under-power	10%
• Importer not valid	6%
• Failure – no warranty	6%

### Tests conducted

The PV Module testing encompasses:

- maximum power at STC to check conformity with the claimed performance
- EL testing to check for possible damage of the modules in transit, and to check for quality
- Wet Current Leakage Test to check for low resistance to earth
- visual check for defects and quality
- component check for conformity of materials covered by the certificate. At present this covers frame thickness, junction box, diodes, cable and connectors.

In addition, the following checks are carried out by the CEC:

- serial number format
- verification of certification including claims of enhanced listing options
- availability of customer documentation on the importer or local manufacturer website

If the CEC's testing identifies non-conformance with the device's certification, the CEC may suspend or remove the listing of the device until compliance can be verified.

In 2018, as a result of testing, 13 PV module brands (representing 246 modules) were de-listed and a further five PV module brands (representing 134 modules) had their listing suspended whilst rectification works were undertaken. Many of these were reinstated or re-listed after corrective actions were completed.

In 2019, the test program will expand to include backsheet testing, as well as testing modules from high volume brands.

#### **Post-testing product disposal**

At the culmination of testing, PV modules are sent to other approved research or testing programs, or a registered recycling partner where they cannot be reused.

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## **Inverters and Power Conversion Equipment (PCE)**

### **3.1 INVERTER/PCE APPROVAL**

The Clean Energy Council maintains a database of Inverters and PCE that meet the relevant Australian and International standards including:

- AS/NZS 4777.2
- IEC 62109.1 and .2
- IEC 62040

In order to be approved by the CEC, the inverter must be independently certified by a JAS-NZ accredited certification agency, or state electrical safety regulator. Test reports must be submitted along with the certificate, for detailed reference and for dealings with electrical safety bodies.

The CEC also examines the customer documentation provided by applicants for potentially misleading information or misrepresentations, and our terms and conditions require applicants to name their importer or local manufacturer, who must be a legal entity holding an ABN.

This is to ensure there is a point of contact responsible for meeting manufacturer warranty obligations under Australian Consumer Law.

Device ratings and functions are recorded on the CEC database (such as input voltage range, rated output power, PQ modes etc.) and these are reported to government and distribution network service providers (DNSP) to assist in the management of incentive schemes and/or connection processes.

### **3.2 TESTING AND COMPLIANCE**

Since 2015, CEC has maintained a log of reported inverter complaints, including reports through the PV system fault reporting portal on the Accreditation website. The inverter testing program started in late 2017 and has initially been run as a targeted program, with inverter selection based on a risk analysis and on the log of failure reports from the market.

Basic PV grid-connected single phase inverters up to 5 kW (typically 3 kW) were selected for the first round of testing.

The inverters come from product stocked in Australia so that there is no requirement for the supplier to ship one in from the manufacturer, as this helps to avoid suppliers “cherry picking” samples for testing.

Suppliers were located either through the ERAC Responsible Supplier database, or through an internet search.

Where possible, product is purchased by agents on behalf of the CEC so that suppliers are unaware the product is to be used for testing.

The **Inverter** testing encompasses:

- AS 4777.2 Passive anti-islanding – Appendix G
- AS 4777.2 Harmonic distortion – Appendix C
- Active anti-islanding via either:
  - AS 4777.2 Appendix F or,
  - IEC 62116 Active anti-islanding, where listed by CEC as conforming to this standard
- IEC 62109-1 Labelling and Documentation Clause 5.1, 5.2, 5.3
- IEC 62109-1 Critical components identification

In addition, the following checks are carried out by CEC:

- verification of PV connector and comparison with documentation
- comparison of software version with original test report
- warranty document compliance with ACCC mandatory wording
- registration on ERAC database of responsible supplier and inverter models
- availability of customer documentation on the importer or local manufacturer website.

## 2018 testing and compliance summary

As with PV modules, product testing is targeted to the low end of market and a review of any complaints received. In 2018, as a result of product testing, six inverter brands (representing 72 inverter models) were de-listed. Three of these companies were reinstated or re-listed after corrective actions were completed.

The first round of testing encompassed five string inverters. Of the five inverters tested in the first round of testing conducted in 2018, four of the models failed the passive anti-islanding tests, representing a major non-conformance.

One inverter brand also failed the active anti-islanding test, resulting in an Australia-wide ACCC Voluntary Recall being required.

The provisions of AS 4777.2 regarding passive anti-islanding places a critical requirement on installers to check the inverter configuration is set correctly for Australia and AS 4777.

It was found that in some cases this requirement was not detailed in the installation manual, and that often the inverter was already labelled as compliant to AS 4777. The CEC now checks the installation manual to ensure the process for setting the country code is clearly explained.

Some further minor non-conformances identified included:

- unavailability of warranty support
- warranty docs missing mandatory ACL wording

Safety bulletins were sent to installers, DNSPs and regulators in relation to all major non-conformances.

The second round of testing is now underway and will continue into 2019. This round has been expanded to cover product from ten inverter brands.

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## Energy Storage Devices

### 4.1 ENERGY STORAGE DEVICE APPROVAL

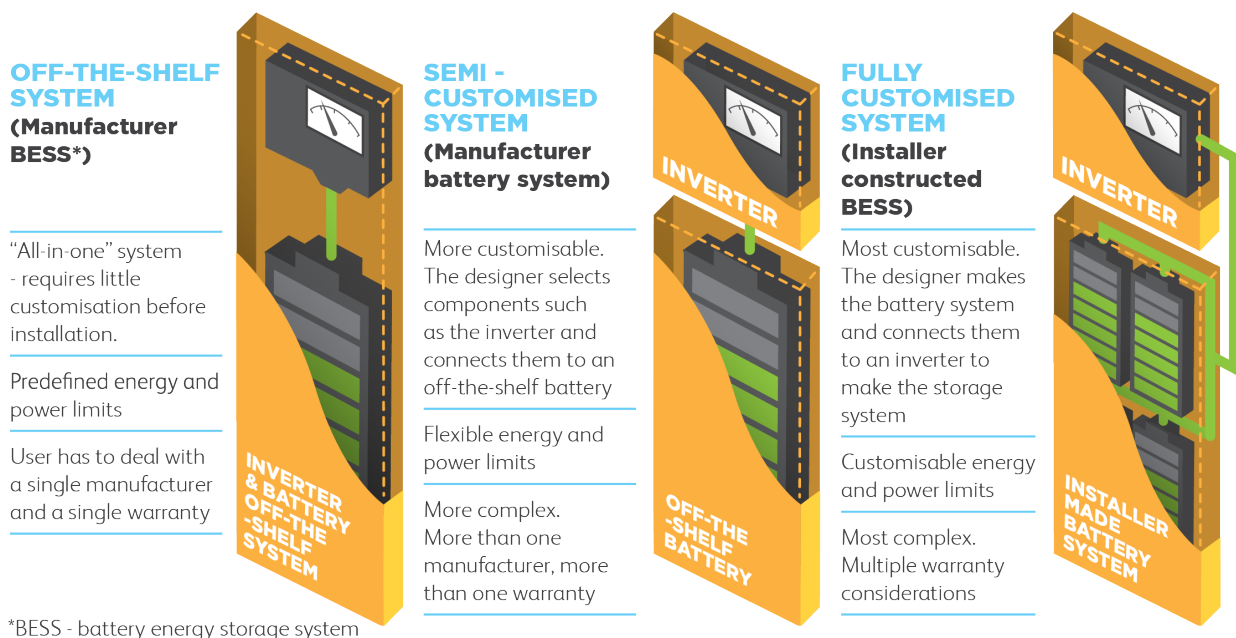
In October 2018, the Clean Energy Council introduced the Battery Assurance program to its suite of product programs. The CEC's approved Energy Storage Devices (ESD) comprises Lithium-based ESDs compliant with the [Best Practice Guide: Battery Storage Equipment – Electrical Safety Requirements](#).

The Best Practice Guide and associated Risk Matrix were developed by industry associations, including the CEC, with input from CSIRO, energy network operators, private certification bodies and other independent stakeholder groups and individuals, as well as consumer and electrical safety regulators after noting the lack of product safety standards in Australia for battery storage systems.

The guide applies to lithium-based battery storage equipment and includes:

- Battery module (BM) is one or more cells linked together. May also have incorporated electronics for monitoring, charge management and/or protection. Battery modules are installed within pre-assembled battery system equipment or pre-assembled integrated battery energy storage system equipment or as part of a master/slave configuration of such equipment.

- Pre-assembled battery system (BS) is a system comprising one or more cells, modules or battery system, and auxiliary supporting equipment such as a battery management system and protective devices and any other required components as determined by the equipment manufacturer. A BS system does not include a PCE. Pre-assembled battery system equipment comes in a dedicated enclosure. The equipment is a complete package for connection to a DC bus or DC input of a PCE.
- Pre-assembled integrated battery energy storage system (BESS) is a battery energy storage system manufactured as a complete integrated package with the PCE, one or more cells, modules or battery system, protection devices, PCE and any other required components as determined by the equipment manufacturer. Pre-assembled integrated battery energy storage system equipment is supplied in a dedicated enclosure. Integrated battery energy storage system equipment is a complete package that has AC output for connection to the electrical installation.



The Battery Assurance Program only covers the battery system (BS) and battery energy storage system (BESS) products. These products are assessed using the first three methods of compliance outlined in the Battery Safety Guide. The main and secondary standards required for the three compliance methods are listed below. These are required along with extra separate specific requirements, as well as other inverter standards, as applicable.

	Method 1	Method 2	Method 3
<b>Required Primary</b>	<ul style="list-style-type: none"> <li>• AS IEC 62619 (or IEC 62619:2017)</li> <li>• AS/NZS 60950.1 or</li> </ul>	<ul style="list-style-type: none"> <li>• UL 1973:2013 or UL 1973:2018</li> </ul>	<ul style="list-style-type: none"> <li>• AS IEC 62619 (or IEC 62619:2017)</li> </ul>

<b>Standards:</b>	AS/NZS 62368.1:2018	• AS/NZS 60950.1:2003(R2013) or IEC 62040.1:2017
<b>Required Secondary Standards</b>	• AS/NZS 60335.1:2011 Or UL 1973 (2013 or newer)	• NA • AS/NZS 60335.1:2011 Or UL 1973 (2013 or newer)

## 4.2 TESTING AND COMPLIANCE

Energy Storage Devices are subject to the same internal compliance audits as PV Modules and Inverters.

Pre-assembled integrated battery energy storage systems (BESS) will be gradually included in the current inverter testing program throughout 2019.

## FURTHER DETAILS

### 5.1 GLOSSARY OF TERMS

ACL	Australian Consumer Law
BESS	Pre-assembled integrated battery energy storage system
BS	Pre-assembled battery system
CEC	Clean Energy Council
CER	Clean Energy Regulator
DNSP	Distribution Network Service Provider
EL testing	Electroluminescence testing
ERAC	Electrical Regulatory Authorities Council
ESD	Energy Storage Device
IEC	International Electrotechnical Commission

IECEE	IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components
IECEE CB Scheme	International system for mutual acceptance of test reports and certificates
JAS-ANZ	Joint Accreditation System of Australia and New Zealand
NCB	National Certification Bodies
OEM	Original Equipment Manufacturer
PCE	Power Conversion Equipment
PQ	Power Quality
PV	Photo Voltaic
STC	Standard Test Conditions
UPS	Uninterruptible Power Systems

## 5.2 GLOSSARY OF STANDARDS

AS IEC 62619	Secondary cells and batteries containing alkaline or other non-acid electrolytes
AS/NZS 4777.2:2015	Grid connection of energy systems via inverters - Part 2: Inverter requirements
AS/NZS 5033:2014	Installation and safety requirements for photovoltaic (PV) arrays
AS/NZS 60335.1:2011	Household and similar electrical appliances - Safety General requirements
AS/NZS 60950.1	Information technology equipment - Safety General requirements
AS/NZS 62368.1:2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements
IEC 60068-2-68	Environmental testing - Dust and Sand
IEC 61215	Terrestrial photovoltaic (PV) modules - Design qualification and type approval
IEC 61701	Salt mist corrosion testing of photovoltaic (PV) modules
IEC 61730	Photovoltaic (PV) module safety qualification

IEC 62040.1:2017	Uninterruptible power systems (UPS) - Part 1: Safety requirements
IEC 62109-1	Safety of power converters for use in photovoltaic power systems - Part 1: General requirements
IEC 62109-2	Safety of power converters for use in photovoltaic power systems - Part 2: Particular requirements for inverters
IEC 62116	Utility-interconnected photovoltaic inverters - Test procedure of islanding prevention measures
IEC 62716	Photovoltaic (PV) modules - Ammonia corrosion testing
IEC 62804	Photovoltaic (PV) modules - Test methods for the detection of potential-induced degradation
IEC 62941	Terrestrial photovoltaic (PV) modules - Guideline for increased confidence in PV module design qualification and type approval
UL 1973:2013	Batteries for use in light electric rail applications and stationary applications
UL790	Standard for Standard Test Methods for Fire Tests of Roof Coverings

### 5.3 CONTACT US

If you would like further information on the Clean Energy Council's Product Assurance Program or any of the data contained in this Annual Report, please contact us on 03 9929 4100 or at [products@cleanenergycouncil.org.au](mailto:products@cleanenergycouncil.org.au)

To log a product fault or concern, please fill out the product fault report form at <http://www.solaraccreditation.com.au/products/product-faults-testing/product-fault-report-form.html>