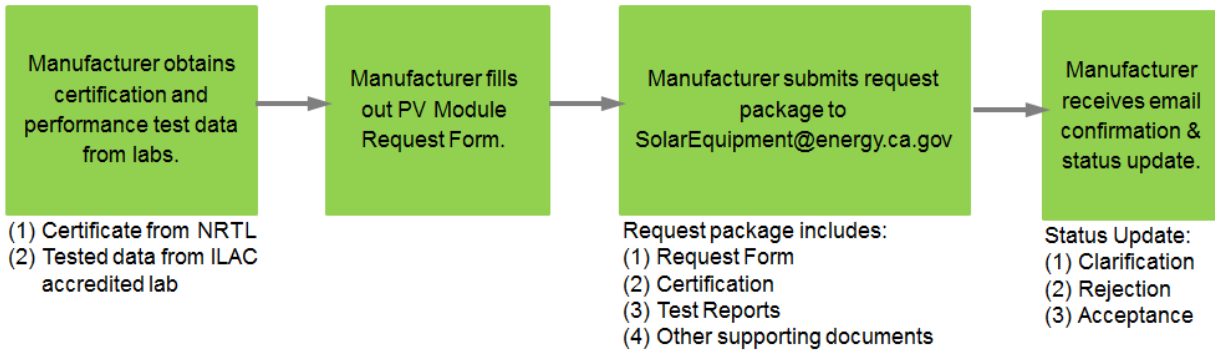


Photovoltaic (PV) Module Listing Request Instructions



General Guidance for PV Module Listing Request:

- Requirements are detailed in the [Guidelines for California's Solar Electric Incentive Programs \(Senate Bill 1\), Seventh Edition](#)
- **Equipment manufacturer must submit the request.**
- Reports and documents must be written in English.
- Submit all the required documentation **in a single email**. Incomplete requests will be rejected and removed from the review process; a complete request must then be resubmitted.
- Requests containing falsified reports or altered forms will be rejected. The equipment may be permanently prohibited from inclusion on the list, and the manufacturer permanently prohibited from having equipment listed.
- Refer to the [California Energy Commission website](#) for additional instructions, examples, and best practices to avoid common mistakes.
- **NOTE: Data and information submitted to the Energy Commission are public record. Do not submit any proprietary or confidential information. Proprietary or confidential information on required documents must be redacted or omitted prior to submission.**

Document Requirements for a PV Module Listing Request:

1. Required Request Documents

The manufacturer submits the listing request **in a single e-mail** to SolarEquipment@energy.ca.gov. Include a subject line stating the purpose of the equipment request (new or revised), the equipment type (PV Module), and the manufacturer's name. Attach to the e-mail all required documentation:

- a) PV Module Listing Request Form.
- b) Nationally Recognized Testing Laboratory (NRTL) safety certification to UL 61730 from a NRTL whose OSHA Scope of Recognition includes the UL 61730 standard¹.
- c) International Laboratory Accreditation Cooperation (ILAC) accredited lab's test report(s) for IEC 61215:2005 (Crystalline) or IEC 61646:2008 (Thin Film).
- d) Additional supporting documentation, as required by Energy Commission staff. Please note that submitted information is public record; **do not submit any proprietary or confidential information.**

2. Minimum Criteria for Safety Certification

The safety certification(s) document must meet the requirements outlined below.

- a) Signed or stamped and dated by NRTL whose OSHA Scope of Recognition includes the UL 61730 standard (both –1 and –2 sections).
- b) Indicates the UL 61730 standard (both –1 and –2 sections) and Source Requirement Documents (SRDs) for the test.
- c) Specifies the requested model number(s) certified.
- d) Defines all the wildcards in model number(s).

3. Minimum Criteria for Performance Data Test Report(s)

The testing lab must meet the following qualifications:

- a) The laboratory is accredited to ISO/IEC 17025.
- b) The accreditation must be from an accreditation body that is a signatory to the ILAC Mutual Recognition Arrangement (MRA).
- c) The scope of accreditation must include **IEC 61215** or **IEC 61646**, whichever is applicable.

The performance test report must meet the requirements outlined below.

- a) Signed or stamped and dated by the testing lab.

¹ A current list of NRTLs approved by OSHA, along with their recognized scopes, can be found on the OSHA website.

- b) Refers to subsections 10.2, 10.4, 10.5, 10.6, and 10.7 of IEC 61215:2005 (crystalline) or IEC 61646:2008 (thin film) and includes data for:
 - NOCT
 - Temperature coefficients (α_{ISC} , β_{VOC} , γ_{Pmax})
 - Performance at STC
 - Performance at Low Irradiance
 - Performance at NOCT
- c) Specifies the model number(s) tested.
- d) Specifies all the model numbers that the test results can be applied to.
- e) Reports test data without the impact of any integrated optimizer (see FAQs #5 below).

Instructions for Completing the PV Module Request Form

Download the latest version of the [PV Module Listing Request Form](#). Complete all of the required fields.

- a) List the manufacturer's legal name (as listed on the certification). Any company name differences must be clarified through a signed letter submitted on company letterhead (see FAQs #1 below).
- b) Enter all test report numbers corresponding to all the Lab Tested Models (LTM: see Glossary) in the "ILAC-Accredited Laboratory Report Number(s)" section.
- c) For [Multiple Listing](#) requests and [ACPV](#) requests, refer to the respective instructions.
- d) Select the appropriate "Request Type". This selection applies to all the groups in the request form. Use [separate request forms](#) for different request types (Addition or Revision).
 - For a group consisting of adding new DC modules to the online list, choose the "Add DC Modules" option.
 - For a group consisting of only revisions to existing DC modules on the online list
 - i. Select the "Revise UL 1703 to UL 61730" option to only revise the safety certification standard.
 - ii. Select the "DC Module Revision for New Test Report" option to revise the existing performance data.
 - iii. Select the "Other DC Module Revisions" for any other revisions.
 - For a group consisting of both additions and revisions, choose the "Add DC Modules" option.
- e) Refer to **Section 5 Grouping Model Numbers for Testing** (below) for instructions on how to choose module groups and respective LTMs.

- f) Provide any additional information to further explain or clarify the details of each sub-group in the "Notes" section. Accurate and detailed notes will help prevent the need for clarification and ensure timely processing of the listing request without further delays.
- g) In Table 2, the nameplate ratings are compared to the tested values from the test report. If any of the test values are outside the acceptable range, the group is not eligible. Any pink-colored cells in the "Tested vs. Nameplate" row may indicate ineligibility.
 - o Tested Pmax must be within $\pm 5\%$ of nameplate rating.
 - o Tested Isc, Voc, I_{pmax} and V_{pmax} must be within $\pm 10\%$ of nameplate rating.
- h) In Table 3, in the description field, enter a description that meets the requirements below. This description will be posted on the Energy Commission's PV Module List. Do not include any marketing or subjective statements.
 - o Power rating.
 - o Module type (Monocrystalline, Polycrystalline, and Thin Film).
 - o Backsheet color.
 - o Definition of each wildcard. Wildcards in the model number are only acceptable for non-technical features that don't affect module performance, such as frame type or connector type, but not power rating (see FAQs #4 below).

For example: *300W Monocrystalline module, black backsheet, "y" is wildcard for frame color (W for white or B for black).*

- i) Identify the safety standard the model number is certified under, by selecting the applicable option from the dropdown in the "Safety Certification" field of Table 3. Select "Both" and provide safety certification document(s) for both standards if the model number is certified under both UL 1703 and UL 61730.
- j) Identify whether a certification to IEC 61215:2016 is included in the listing request, by selecting "Y" or "N" in the "Design Qualification" field. If "Y", please provide the certification document(s) in the listing request. If you choose to not submit the certification, select "N".
- k) Identify whether a test report for IEC 61853-1:2011 is included in the listing request, by selecting "Y" or "N" in the "Performance Evaluation" field. If "Y", please provide the test report(s) in the listing request. If you choose to not submit the test report, select "N".
- l) In Table 3, in the "Ac" field (module coverage area), enter the PV module area (in square meters, m²), excluding the frame. For non-rectangular modules, please add a note at the bottom of Table 3 indicating the general shape of the module and attach supporting documentation, such as drawings with dimensions and calculations.
- m) Look at the notes in the cell headings for additional guidance.

1. Grouping Model Numbers for Testing

Modules may be grouped together to reduce the number of test reports. One module, “LTM”, is selected for electrical characterization testing, and the results are applied to the other modules in the group. The models in the same group must be determined to be similar enough for testing purposes.

- a) This determination is made by the ILAC-accredited laboratory conducting the testing.
- b) In the test report, the ILAC-accredited laboratory shall describe the differences among the models and state that these models can be grouped for testing purposes.

Use the following requirements to choose the group LTM.

- a) The chosen LTM must be among the model numbers in the group.
- b) When grouping a set of models, the maximum power (Pmax) of the LTM must be no lower than 95% of the highest Pmax in the group. For example, if the highest Pmax in a group is 300 W, the LTM Pmax must be 285 W ($300 \text{ W} \times .95$) or greater.
- c) No models in the group can have a Pmax that is more than 10% lower than the LTM Pmax. For example, if the LTM Pmax is 285 W, no model in the group can have a Pmax below 257 W ($285 \text{ W} \times .90$).

There are two scenarios for the group LTM:

- a) Using a non-listed model as the LTM: Enter the data of the LTM in Table 1 of the request form and choose the “Add” option for the “Add or Revised” cell.
- b) Using a previously-listed model as the LTM: When requesting to add a new model to the list, the test report of a previously-listed model may be used. The existing model (chosen LTM) must be grouped with the new models being requested. Enter the data of the LTM in Table 1 of the request form and choose the “Revise” option for the “Add or Revised” cell. The ILAC-accredited laboratory must determine that all models are similar enough to be grouped, and the grouping must meet the requirements above.

Instructions for Submitting Optional Documentation with a PV Module Listing Request

The manufacturer may submit, as a part of the listing request, additional document(s) from accredited laboratories. If submitted, the information will be evaluated by Energy Commission staff. Upon approval of the listing request, Energy Commission staff will indicate that the model numbers have completed the optional certification or testing on the Energy Commission’s Solar Equipment Lists. The documents that will be accepted are:

- a) Design qualification certification to IEC 61215:2016.
- b) Performance evaluation report in accordance with IEC 61853-1:2011.

1. Minimum Criteria for Optional Document(s)

The test lab issuing the document(s) must meet the following qualifications:

- a) The laboratory is accredited to ISO/IEC 17025.
- b) The accreditation must be from an accreditation body that is a signatory to the ILAC Mutual Recognition Arrangement (MRA).
- c) The scope of accreditation must include **IEC 61215:2016** or **IEC 61853-1:2011**, whichever is applicable.

Any document(s) provided to support the indication of optional testing or certification must include the following:

- a) Design qualification certification to **IEC 61215:2016**.
 - Signed or stamped and dated by the testing lab.
 - Indicates the IEC 61215:2016 standard.
 - Specifies the model number(s) certified.
 - Defines all the wildcards in model number(s).
- b) Performance evaluation report in accordance with **IEC 61853-1**.
 - Signed or stamped and dated by the testing lab.
 - Refers to IEC 61853-1:2011.
 - Test measurements and data reported in accordance with IEC 61853-1:2011, Section 6.
 - Specifies the model number(s) tested.
 - Specifies all the model numbers that the test results can be applied to.

FAQs

1. What if I want my equipment listed under a different manufacturer name than the name on my certification?

If a manufacturer wants equipment listed under a different manufacturer name, the manufacturer must submit a letter containing the information listed below:

- Submitted on company letterhead.
- Signed and dated by an authorized representative of the company.
- The legal name of the manufacturer (from the certification).
- The name that manufacturer wants to use for equipment listing purposes.
- The reasoning behind the request (for example, a manufacturer may want to list the brand name instead).
- An explanation of all manufacturer name variations found on the submitted documents and the relation between each manufacturer name and the manufacturer name reported on the certification (parent company, subsidiary, etc.).

2. Why does the backsheet color matter for listing purposes?

Different backsheet colors influence the temperature of the module; higher temperatures reduce module efficiency. In general, modules with black backsheets will have higher temperatures, likely resulting in lower efficiency when compared to modules with white backsheet. Modules with white backsheets can be listed using the more conservative black backsheet test results; however, the opposite is not allowed. If the test results of a module, being used as the LTM, represent both white backsheet and black backsheet modules, the test report should detail the backsheet color of the tested module. This applies only to white backsheet and black backsheet models, not to models with a clear backsheet or any other color.

3. Can modules with a different number of cells but similar in construction materials be grouped together?

Model numbers may be grouped only at the discretion of the ILAC-accredited laboratory. If models differ by the number of cells, the laboratory may determine they are similar enough to be grouped and use the same test results. In this case, the laboratory must explicitly state this determination on the test report and include all the applicable model numbers.

4. What are wildcards and how are they used?

A wildcard is a symbol used to replace or represent one or more characters. The use of wildcards for model numbers must be clearly defined. The use of wildcards in certification documents or test reports is at the discretion of the testing body, but may not necessarily be allowed for listing purposes. In general, for inclusion on the PV modules list, wildcards are limited to details that are non-technical (such as frame color) and do not affect performance.

5. What if I have a PV module that has an integrated optimizer (e.g. “Smart PV Module”)?

If your PV module has an integrated optimizer (e.g. in the junction box), you must have the module tested with the optimizer bypassed.

The provided data in the performance test report must be for the PV module energy generation without the influence of the optimizer. The testing lab should identify the integrated optimizer in the test report for the relevant models numbers and verify that all the tests were completed on the PV module without the optimizer.

Furthermore, the manufacturer must include the integrated optimizer information in the “Notes” section of Table 1 in the request form.

6. How do I know my request has been received?

The Energy Commission sends a confirmation email upon receipt of an equipment listing request. A unique request ID number ("R number") will be assigned to each request and will be included in the confirmation email.

7. What if I have questions or need updates on my request?

You can contact the Solar Equipment Call Center at (916) 654-4120 or SolarEquipment@energy.ca.gov for any equipment listing questions. Please reference your "R" number to help Energy Commission staff identify the specific request. Manufacturers also receive email notifications from the Energy Commission when the status of a request changes or decisions (acceptance, clarification needed, or rejection) are made.

8. How does the Energy Commission process my request?

Requests are processed on a first-in, first-out basis, and involve a 2-phased process: Phase 1 consists of an administrative screening, and Phase 2 consists of a technical evaluation. Only those requests that pass administrative screening will be reviewed for technical evaluation. Requests that are complete and accurate on their first submission take typically no more than 45 days to be approved from the date the request was received. If clarification or additional information is required, or the request is rejected because of omissions or deficiencies, the Energy Commission will typically notify the manufacturer within 30 days. Requests that require clarification will take longer to complete than complete and accurate requests, and may take significantly longer than the 45-day timeline to complete the review and posting of approved equipment on the Energy Commission's Solar Equipment Lists. The Energy Commission updates the solar equipment lists three times a month, typically on the 1st, 11th, and 21st of the month, or the first business day thereafter.

GLOSSARY

ACPV - An **alternating-current (AC) photovoltaic (PV)** module is defined in Section 690.2 of the 2005 National Electrical Code (NEC) as a "complete, environmentally protected unit consisting of solar cells, optics, inverter, and other components, exclusive of tracker, designed to generate **AC** power when exposed to sunlight."

BIPV - Building Integrated Photovoltaic Module. If module is rack mounted, select "N."

Group - A set of modules with similar physical characteristics put together for testing purposes. The NRTL conducting the testing shall determine which modules can be in the same group. The NRTL must state on the test report that the modules the test applies to are similar enough for the test results to be applied. Previously listed modules may be grouped with new modules in a request, and are still subject to all grouping requirements.

LTM - Laboratory Tested Model. This may either be a new, unlisted model or a previously listed model. A test report for the LTM must always be submitted, except for multiple listing requests which do not require an LTM.

NOCT - Nominal Operating Cell Temperature. The temperature reached by open circuited cells in a PV module under the following conditions: 800 watts per square meter irradiance on cell surface, 20 degrees Celsius air temperature, 1 meter per second wind velocity, and open back side mounting.

STC - Standard Test Conditions. The test conditions are 1000 watts per square meter irradiance, 25 degrees Celsius cell temperature, and Air Mass 1.5 spectrum.