



Changes to the Inverter and Energy Storage System Lists: UL 1741 3rd Edition inclusive of Supplement SB



California Energy Commission

Training presented by the Renewable Energy Division's Solar Equipment Lists Team

March 2022



Training Outline

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The Solar Equipment Lists

- Developed under California Senate Bill 1 (SB1) establishing criteria and standards for solar incentive programs under the California Solar Initiative.
- Includes solar equipment that meets established national safety and performance standards.
- Provides information and data that support solar incentive programs, utility grid connection services, consumers, and state and local programs.



What's New?

- New tests for advanced functionalities – **UL 1741 3rd edition inclusive of Supplement SB**
- Changes to Grid Support Inverter List and related forms and instructions
 - Changes to Grid Support Inverter List
 - Request Forms & Instructions
- Changes to Energy Storage System List related forms and instructions
 - Changes to Energy Storage System List
 - Request Forms & Instructions



Changes to Grid Support Inverter & Energy Storage Systems List

Energy Storage System List (Full Data)
Data has not changed since January 21, 2022

Energy Storage System List Notes

Notes: For more information on the status of the **Model Number**, see [Energy Storage System List Model Number](#). For more information on the status of the **Capacity**, see [Energy Storage System List Capacity](#). For more information on the status of the **Depth of Discharge**, see [Energy Storage System List Depth of Discharge](#). For more information on the status of the **Efficiency**, see [Energy Storage System List Efficiency](#). For more information on the status of the **Round-trip Efficiency**, see [Energy Storage System List Round-trip Efficiency](#). For more information on the status of the **Self-discharge Rate**, see [Energy Storage System List Self-discharge Rate](#). For more information on the status of the **Temperature Coefficient**, see [Energy Storage System List Temperature Coefficient](#). For more information on the status of the **Warranty**, see [Energy Storage System List Warranty](#). For more information on the status of the **UL 1741 Supplement SB Certification**, see [Energy Storage System List UL 1741 Supplement SB Certification](#). For more information on the status of the **UL 1741 Supplement SB Certification Date**, see [Energy Storage System List UL 1741 Supplement SB Certification Date](#).

UL 1741 Supplement SB Certification

3rd Edition

UL 1741 (3rd Ed.) Supplement SB Certification

Certifying Entity

Certificate Date [mo/day/yr]

System ID	System Name	System Type	Capacity (kWh)	Depth of Discharge (%)	Efficiency (%)	Round-trip Efficiency (%)	Self-discharge Rate (per day)	Temperature Coefficient (per °C)	Warranty (years)	UL 1741 Supplement SB Certification		UL 1741 Supplement SB Certification		UL 1741 Supplement SB Certification	
										Certification Status	Certificate Date	Certification Status	Certificate Date	Certification Status	Certificate Date
1	System 1	Grid Support	100	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
2	System 2	Grid Support	200	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
3	System 3	Grid Support	300	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
4	System 4	Grid Support	400	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
5	System 5	Grid Support	500	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
6	System 6	Grid Support	600	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
7	System 7	Grid Support	700	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
8	System 8	Grid Support	800	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
9	System 9	Grid Support	900	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01
10	System 10	Grid Support	1000	90	95	10	0.1	0.001	10	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01	UL 1741 Supplement SB Certification	2021-01-01



Criteria for the Submitted Safety Certificate Document

The UL 1741 (including Supplement SB) certification document must meet the following criteria:

- Signed or stamped and dated by NRTL whose OSHA Scope of Recognition includes UL 1741.
- Indicates the **UL 1741 (3rd Edition)** standard including Supplement SB, as well as Source Requirement Documents (SRDs) for the test (e.g., compliance with California Rule 21).
- Indicates compliance with IEEE 1547:2018 and IEEE 1547.1:2020.
- Specifies the requested model number(s) certified.
- Defines all the wildcards in model number(s).
- Specifies inverter type is “Grid Support Utility Interactive”.

[CEC Solar Equipment Lists Webpage](#)



Changes to the Grid Support Inverter Listing Request Form

Inverter Listing Request Form
[See the [Inverter Listing Request Instructions](#) for Listing Requirements] ID # _____ (For Internal Use Only)
NOTE: Please do not submit any proprietary or confidential information; all submitted information is public record.

Manufacturer Information

Manufacturer Name: _____
Manufacturer Currently has Inverters on List: Yes No
Update Manufacturer Name of Current Listings (if different) to above name?: Yes No
Request Type: Add Reuse
Reason for Revision (or indicate N/A): _____
Manufacturer Contact Name: _____
Address: _____
Phone Number: _____
Email Address: _____
Model Number(s) (Submit one form for each group):
New Existing Model: _____ Voltages (V): _____
New Existing Model: _____ Voltages (V): _____
New Existing Model: _____ Voltages (V): _____
New Existing Model: _____ Voltages (V): _____
New Existing Model: _____ Voltages (V): _____
Brief Description (will be included on online equipment listing, up to 80 characters. Please do not include marketing statements):
(Example Description: 3 kW, 240 Vac Grid Support Utility Interactive Inverter) _____
Inverter Type (check all that apply):
Grid Support Utility Interactive Microinverter Part of AC/DC Module
Firmware Version(s) Tested (only required for Supplement SA [SAB-SA1S]): _____
General
The requested inverters can accept DC input from _____ (check all that apply):
 PV Battery Other

Safety Certification to UL 1741 (including Supplement SA)

Model Number(s)	Test Report Number(s) (if applicable)	Test Report Date(s)
•	•	•

Safety Certification to UL 1741 (including Supplement SB)

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) whose Scope of Recognition under the Occupational Safety and Health Administration (OSHA) includes UL 1741? ⁴	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Is the UL 1741 certificate of compliance (or Authorization to Mark) from a NRTL and for the requested inverter model number(s)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does the UL 1741 certificate of compliance for the requested inverter model number(s) include Supplement SB? (UL 1741-3 rd Edition must be utilized)	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Was compliance with the current California Rule 21 Source Requirement Document (SRD) confirmed by the tests? o Identify compliance with any other SRDs: _____	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does the UL 1741 certificate of compliance for the requested inverter model number(s) mention compliance with IEEE 1547:2018 and IEEE 1547.1:2020 standards?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Was the test equipment calibrated when the test was performed?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

Communications Conformance

_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>
_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>
_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>
_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>
_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>
_____	NO <input type="checkbox"/>	NO <input type="checkbox"/>

Safety Certification to UL 1741 (including Supplement SB)

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) whose Scope of Recognition under the Occupational Safety and Health Administration (OSHA) includes UL 1741? ⁴	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Is the UL 1741 certificate of compliance (or Authorization to Mark) from a NRTL and for the requested inverter model number(s)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does the UL 1741 certificate of compliance for the requested inverter model number(s) include Supplement SB? (UL 1741-3 rd Edition must be utilized)	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Was compliance with the current California Rule 21 Source Requirement Document (SRD) confirmed by the tests? o Identify compliance with any other SRDs: _____	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does the UL 1741 certificate of compliance for the requested inverter model number(s) mention compliance with IEEE 1547:2018 and IEEE 1547.1:2020 standards?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Was the test equipment calibrated when the test was performed?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

¹ Deviation of time signed is _____
² A group is _____
³ is the Power Rating _____
⁴ A current list of NRTLs approved by OSHA can be found on the OSHA website: <https://www.osha.gov/its/otpcu/nrtl/nrtlts.html>
Revised 10/11/2022



Changes to the Energy Storage System Listing Request Form

Energy Storage System (ESS) Listing Request Form
(See the [Energy Storage System Listing Request Instructions](#) for Listing Requirements) ID # _____ (For Internal Use Only)
 NOTE: Please do not submit any proprietary or confidential information. All submitted information is public record.

Manufacturer Information

Manufacturer Name: _____
 Manufacturer Currently has equipment on Energy Storage System List: Yes No
 Update Manufacturer Name of Current Listing: If different than above, please provide: _____
 Request Type: Add Review
 Reason for Review (or indicate N/A): _____
 Manufacturer Contact Name: _____
 Address: _____
 Phone Number: _____
 Email Address: _____

Energy Storage System Model Number	New/ Existing	Technology	Description	Maximum Continuous Discharge Rate ¹ (MW)	Nominal Voltage (VAC)	Maximum Power (MW)	Maximum Energy Capacity (MWh)

UL 9540 Safety Certification

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) recognized by the Occupational Safety and Health Administration (OSHA)?
 YES NO

UL 1741 Safety Certification including Supplement SA (Optional)

Have test report(s) for each model number been submitted? YES NO

UL 1741 Safety Certification including Supplement SB (Optional)

Is the test lab a Nationally Recognized Testing Laboratory (NRTL) whose Scope of Recognition under the Occupational Safety and Health Administration (OSHA) includes UL 1741?⁶
 YES NO

Identify the equipment that is certified to UL 1741
 If certification is for an inverter, the model number⁷ of the inverter: _____
 Inverter ESS

Does the UL 1741 certificate of compliance for the requested inverter model number(s) include Supplement SB? (UL 1741-3rd Edition must be utilized)
 YES NO

Was compliance with the current California Rule 21 Source Requirement Document (SRD) confirmed by the tests?
 o Identify compliance with any other SRDs: _____
 YES NO

Does the UL 1741 certificate of compliance for the requested inverter model number(s) mention compliance with IEEE 1547:2018 and IEEE 1547.1:2020 standards?
 YES NO

Was the test equipment calibrated when the test was performed?
 YES NO

Communications Conformance (Optional)

Is the requested model number certified to the Common Smart Inverter Profile (CSIP)?
 YES NO

¹ Deviation of manufacturer name or legal name from the name on the certification will require the manufacturer to submit a one-time signed letter on official letterhead explaining the relationship between names and which name to use for their listings.
² Maximum continuous discharge rate as stated by the manufacturer on the spec sheet.
³ A current list of NRTLs approved by OSHA can be found on the OSHA website: <https://www.osha.gov/nrtls/nrtls/nrtls.html>
⁴ If inverter does not have a model number, provide the manufacturer part number from the certificate.
 Revised 02/11/2020

⁶ A current list of NRTLs approved by OSHA can be found on the OSHA website: <https://www.osha.gov/nrtls/nrtls/nrtls.html>
⁷ If inverter does not have a model number, provide the manufacturer part number from the certificate.
 Revised 02/11/2020



Utilizing Comparable SB Tests to Reflect SA Information

Function/Test	UL 1741 Supplement SA Section	UL 1741 3rd Edition Supplement SB Section*
SA8-Anti-Islanding	Confirmed	Tested
SA9-Low and High Voltage Ride-Through	Confirmed	Tested
SA10-Low and High Frequency Ride-Through	Confirmed	Tested
SA11.2-Normal Ramp Rates	Tested	N/A
SA11.4-Soft-Start Ramp Rates	Confirmed	Tested
SA12-Specified Power Factor	Confirmed	Tested
SA13-Volt/Var Mode	Confirmed	Tested
SA14-Frequency-Watt	Confirmed	Tested
SA15-Volt-Watt	Confirmed	Tested
SA17-Disable Permit Service	Confirmed	Tested
SA18-Limit Active Power	Confirmed	Tested

*In compliance with the comparable IEEE 1547.1(2020) section.



Latest versions of the lists, listing request forms, and instructions are accessible from the Grid Support Inverters and Energy Storage Systems sections identified on the [CEC's Solar Equipment Lists webpage](#).



**For additional information, please contact
the Solar Equipment Contact Center at**

(916) 654-4120

or

SolarEquipment@energy.ca.gov

Thank You!