

## EcoFoot2+ Install Guide Appendix - UL2703 Qualification

Ecolibrium Solar® EcoFoot2+ Flat-Roof Ballasted Racking System

Ecolibrium Solar's EcoFoot2+ product has been tested in accordance with the ANSI/UL2703-2015 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels. This testing standard includes subjecting samples of the racking to temperature and humidity cycling to simulate component aging, electrical bonding tests on all system components, system grounding tests, tests to verify that use of the system does not increase the risk of fire, and module-specific mechanical load testing.

EcoFoot2+ racking maintains a Class A fire rating when installed in landscape or portrait orientation according to the installation instructions, on a low slope roof Class A roof with Type 1 and Type 2 modules. For roofs with lower fire ratings, the existing rating is maintained when EcoFoot2+ is used.

EcoFoot2+ module clamps and wind deflectors are certified as recognized components under UL2703 for system electric bonding when installed with the below listed modules. Rows within an array, having a fuse rating of up to 25 amps, may be grounded via a single properly sized ground lug acting as a Grounding Electrode Conductor (GEC). The EcoFoot2+ install guide contains instructions for bonding and grounding modules if deviation from standard installation is required. Per UL2703, the EcoFoot2+ system creates a continuous bonded structure with all the below listed modules when installed per instructions in the install guide.

Mechanical load testing has been conducted in 2 ways. Firstly, load testing has been completed on system components that have been subject to temperature and humidity cycle tests. This verifies the long-term stability of all materials and components used. Secondly, the modules listed below have been mechanically load tested to the UL2703 standard. The module manufacturer and all approved module series are listed with the resulting load ratings in the table below.

**UL2703 System Label:** The label shown below is stamped into to the Wind Deflector (identified as component E in the installation guide).



The Date Code ABCYZZ shown above will appear on production parts, letters defined as follows:

- ABC shall be an acronym for identifying the source factory
- Y shall be the Quarter of the year (i.e. 1, 2, 3, 4) of manufacture
- ZZ shall be the last 2 digits of the year of manufacture

The below listed modules are listed for mechanical loading, grounding and bonding according to UL2703. The table continues next page.

Note: "XXX" represents module wattage

Manufacturer	Module Series	Max. Downforce w/Mid-span Supports	Max. Downforce w/o Mid-span Supports	Max. Uplift
Boviet Solar	BVM6612 P-XXX	50 psf	30 psf	11.8 psf
	BVM6612 P-XXX (BB)			
	BVM6612-M-XXX			
	BVM6612 M-XXX (BB)			
	BVM6610P-XXX			
	BVM6610M-XXX			
	BVM6610M (BB)-XXX			
BVM6610P (BB)-XXX				
ET Solar	ET-M672XXXWW	40 psf	20 psf	15.0 psf
	ET-M672XXXWB			
	ET-P672XXXWW			
	ET-P672XXXWB			
	ET-M672XXXBB			
ET-P672XXXBB				
Hanwha Q Cells	Q.PRO BFR-G4 XXX	55 psf	20 psf	15.1 psf
	Q.PLUS BFR-G4.1 XXX			
	Q.PRO BFR-G4.1 XXX			
	Q.PRO BFR-G4.3 XXX			
	Q.PEAK-G4.1 XXX			
	Q.PEAK-G4.1/MAX XXX			
	Q.PEAK BLK G4.1 XXX			
	Q.PRO G4 XXX			
	Q.PLUS G4 XXX			
	Q.PEAK-G4.1/TAA XXX			
	Q.PEAK BLK G4.1/TAA XXX			
	Q.PLUS BFR G4.1/TAA XXX			
	Q.PLUS BFR G4.1/MAX XXX			
	B.LINE PLUS BFR G4.1 XXX			
	B.LINE PRO BFR G4.1 XXX			
	Q.PRO EC-G4.4 XXX			
	Q.PLUS L-G4.2 XXX			
Q.PEAK L-G4.2 XXX				
Q.PLUS L-G4.1 XXX				
Q.PLUS L-G4 XXX				
Q.PRO L-G4 XXX				
Q.PRO L-G4.1 XXX				
Q.PRO L-G4.1 XXX				



Manufacturer	Module Series	Max. Downforce w/Mid-span Supports	Max. Downforce w/o Mid-span Supports	Max. Uplift	
	Q.PRO L-G4.2 XXX B.LINE PLUS L-G4.2 XXX B.LINE PRO L-G4.1 XXX B.LINE PRO L-G4.2 XXX	33 psf	30 psf	10.2 psf	
Hyundai	HiS-MXXXTI HiS-SXXXTI	40 psf	30 psf	10.2 psf	
Jinko	JKMXXXP-60 JKMXXXP-72	N/A	30 psf 30 psf	30 psf 15 psf	
Talesun	TP672P-XXX TP672M-XXX	30 psf	20 psf	12 psf	
Yingli	YLXXXP-29b YLXXXC-30b	N/A	30 psf	30 psf	
Trina	TSM-XXX PA05.08	N/A	30 psf	30 psf	
Canadian Solar	CS6P-XXXX CS6P-XXXM CS6X-XXXX	N/A	30 psf 30 psf 38 psf	30 psf 30 psf 15 psf	
	CS6U-XXXX CS6U-XXXM CS6U-XXXX (1500V) CS6U-XXXM (1500V)	50 psf	25 psf	13.3 psf	
	LG	LGXXXN2W-G4	N/A	40 psf	15 psf
	ReneSola	JCXXXM-24/Ab JCXXXM-24/Bb	N/A	30 psf 30 psf	15 psf 30 psf
Silfab	SLG-M XXX SLG-P XXX SLG-X XXX SSG-M XXX SSG-P XXX	30 psf	13.9 psf	13.1 psf	
	SLA-M XXX SLA-P XXX SLA-X XXX SSA-P XXX SSA-M XXX	40 psf	30 psf	13.3 psf	
	SolarWorld	SW Poly Pro SW Poly 2.5 Sunmodule Plus SW Mono Sunmodule Protect SW Mono	N/A	30 psf	30 psf

**Notes:**

- Testing is underway for module data listed as N/A and will be available soon.
- Testing for loads on downslope are not required for ballasted racking.
- The above list is not exhaustive. New modules are being tested on an ongoing basis. Contact Ecolibrium Solar directly for specific module information and Letters of Completion from TÜV Rheinland.

Release Notes		
Revision	Reason	Effective Date
1.0	Initial Release	4/25/17
1.1	<p><b>Modules Added:</b></p> <p><b>Boviet Solar</b>                      BVM6612 P-XXX                      BVM6612 P-XXX (BB)                      BVM6612-M-XXX                      BVM6612 M-XXX (BB)                      BVM6610P-XXX                      BVM6610M-XXX                      BVM6610M(BB)-XXX                      BVM6610P(BB)-XXX</p> <p><b>Hyundai</b>                      HiS-M3XXTI                      HiS-S3XXTI</p> <p><b>Canadian Solar</b>                      CS6U-XXXP                      CS6U-XXXM                      CS6U-XXXP (1500V)                      CS6U-XXXM (1500V)</p> <p><b>ReneSola</b>                      JCXXXM-24/Bb</p> <p><b>Silfab</b>                      SLG-M XXX                      SLA-P XXX                      SLA-X XXX                      SLG-P XXX                      SLG-X XXX                      SSA-P XXX                      SSA-M XXX                      SSG-M XXX                      SSG-P XXX</p> <p><b>Modules Updated:</b>                      Jinko JKMXXXM-72                      LG LGXXXN2W-G4                      ReneSola JCXXXM-24/Ab</p>	5/17/17

Release Notes		
Revision	Reason	Effective Date
1.2	<b>Modules Added</b> <b>Canadian Solar</b> CS6P-XXXM <b>ET Solar</b> ET-M672XXXWW ET-M672XXXWB ET-P672XXXWW ET-P672XXXWB ET-M672XXXBB ET-P672XXXBB <b>Hanwha Q Cells</b> Q.PRO BFR-G4.1 XXX Q.PEAK-G4.1 XXX <b>Silfab</b> SLA-M XXX SSA-M XXX <b>SolarWorld</b> SW Poly Pro SW Poly 2.5 Sunmodule Plus SW Mono Sunmodule Protect SW Mono <b>Talesun</b> TP672P-XXX TP672M-XXX <b>Yingli</b> YLXXXC-30b  <b>Modules Updated:</b> <b>Silfab</b> SLG-M XXX SLG-P XXX SLG-X XXX SSG-M XXX SSG-P XXX SLA-P XXX SLA-X XXX SSA-P XXX <b>Hanwha Q Cells</b> Q.PRO BFR-G4 XXX Q.PLUS BFR-G4.1 XXX Q.PRO BFR-G4.3 XXX Q.PEAK BFR-G4.1 XXX (removed)	9/18/17



Release Notes		
Revision	Reason	Effective Date
1.2	Q.PEAK-G4.1/MAX XXX Q.PEAK BLK G4.1 XXX Q.PRO G4 XXX Q.PLUS G4 XXX Q.PEAK-G4.1/TAA XXX Q.PEAK BLK G4.1/TAA XXX Q.PLUS BFR G4.1/TAA XXX Q.PLUS BFR G4.1/MAX XXX B.LINE PLUS BFR G4.1 XXX B.LINE PRO BFR G4.1 XXX Q.PRO EC-G4.4 XXX Q.PLUS L-G4.2 XXX Q.PEAK L-G4.2 XXX Q.PLUS L-G4.1 XXX Q.PLUS L-G4 XXX Q.PRO L-G4 XXX Q.PRO L-G4.1 XXX Q.PRO L-G4.2 XXX B.LINE PLUS L-G4.2 XXX B.LINE PRO L-G4.1 XXX B.LINE PRO L-G4.2 XXX <b>Jinko</b> JKMXXM-72 changed to JKMXXP-72	9/18/17