

## EcoFoot2+ Install Guide Appendix - UL2703 Qualification

Ecolibrium Solar® EcoFoot2+ Flat-Roof Ballasted Racking System

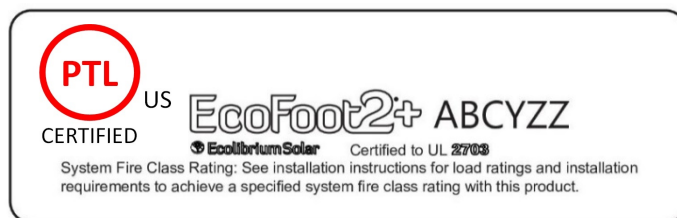
Ecolibrium Solar's EcoFoot2+ product has been tested in accordance with the ANSI/UL2703-2015 Standard for Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels. This testing standard includes subjecting samples of the racking 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 modules below are listed for mechanical loading, grounding and bonding according to UL2703. The table continues on subsequent pages. Note: "XXX" represents module wattage

Manufacturer	Module Series	Downforce Design Load w/Mid-span Supports	Downforce Design Load w/o Mid-span Supports	Uplift Design Load					
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								
Canadian Solar	BVM6610P (BB)-XXX	50 psf	25 psf	13.3 psf					
	CS6P-XXXP				N/A	30 psf	30 psf		
	CS6P-XXXM				50 psf	25 psf	13.3 psf		
	CS6X-XXXP							38 psf	15 psf
	CS6U-XXXP								
	CS6U-XXXM								
CS6U-XXXP (1500V)									
CS6U-XXXM (1500V)									
ET Solar	ET-M672XXXWW	40 psf	20 psf	15.0 psf					
	ET-M672XXXWB								
	ET-P672XXXWW								
	ET-P672XXXWB								
	ET-M672XXXBB								
ET-P672XXXBB									
Hansol	HSXXTD-AN4	35 psf	20 psf	15.0 psf					
	HSXXTD-AN3								
	HSXXUD-AN1								
Hanwha Q Cells (continued next page)	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								



Manufacturer	Module Series	Downforce Design Load w/Mid-span Supports	Downforce Design Load w/o Mid-span Supports	Uplift Design Load	
Hanwha Q Cells (con't.)	B.LINE PLUS BFR G4.1 XXX	55 psf	20 psf	15.1 psf	
	B.LINE PRO BFR G4.1 XXX				
	Q.PRO EC-G4.4 XXX				
	Hanwha Q Cells (con't.)	Q.PLUS L-G4.2 XXX	33 psf	30 psf	10.2 psf
		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					
Hyundai	HiS-MXXXTI	40 psf	30 psf	10.2 psf	
	HiS-SXXXTI				
	HiS-MXXXRI	33.3 psf	20 psf	15 psf	
HiS-SXXXRI					
HiS-SXXXKI					
Jinko	JKMXXXP-60	N/A	30 psf	30 psf	
	JKMXXXP-72		30 psf	15 psf	
LG	LGXXN2W-G4	30 psf	35 psf	15 psf	
	LGXXN2W-A5		18.8 psf	15 psf	
	LGXXN1C-A5				
	LGXXN1K-A5				
	LGXXS1C-A5				
	LGXXS2W-A5				
LONGi	LR6-72-XXXM	40 psf	20 psf	15 psf	
	LR6-72HV-XXXM		20 psf	15 psf	
ReneSola	JCXXM-24/Ab	N/A	30 psf	15 psf	
	JCXXM-24/Bb		30 psf	30 psf	
REC (continued next page)	RECXXTP2 BLK2	50 psf	26 psf	15 psf	
	RECXXTP2 BLK				
	RECXXTP2				
	RECXXTP				
	RECXXTP BLK				
	RECXXPE				
	RECXXPE BLK				
RECXXTP2SB 72 XV	20 psf	15.5 psf	15 psf		



Manufacturer	Module Series	Downforce Design Load w/Mid-span Supports	Downforce Design Load w/o Mid-span Supports	Uplift Design Load				
REC (con't.)	RECXXTP2S 72 XV RECXXTP2S 72	20 psf	15.5 psf	15 psf				
Talesun	TP672P-XXX TP672M-XXX	30 psf	20 psf	12 psf				
Trina	TSM-XXX PA05.08	N/A	30 psf	30 psf				
	TSM-XXXDD14A(II)	40 psf	30 psf	15 psf				
	TSM-XXXDE14A(II)							
	TSM-XXXPE14A TSM-XXXPD14							
S-Energy	SNXXXP-15 SNXXXP-10	30 psf	20 psf	10 psf				
	SNXXXM-10							
	SNXXXM-10 (40T)							
	SNXXXP-10 (40T)							
Silfab	SLG-M XXX SLG-P XXX SLG-X XXX	30 psf	13.9 psf	13.1 psf				
	SSG-M XXX SSG-P XXX							
	SLA-M XXX SLA-P XXX SLA-X XXX				40 psf	30 psf	13.3 psf	
	SSA-P XXX SSA-M XXX							
	SolarWorld	SW Poly Pro SW Poly 2.5 Sunmodule Plus SW Mono Sunmodule Protect SW Mono	N/A	30 psf				30 psf
	Yingli	YLXXXP-29b YLXXXC-30b	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 LGXXN2W-G4                      ReneSola JCXXXM-24/Ab</p>	5/17/17
1.2	<p><b>Modules Added</b></p> <p><b>Canadian Solar</b>                      CS6P-XXXM</p> <p><b>ET Solar</b>                      ET-M672XXXWW                      ET-M672XXXWB                      ET-P672XXXWW</p>	9/18/17



Release Notes		
Revision	Reason	Effective Date
1.2 (con't.)	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) 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	



Release Notes		
Revision	Reason	Effective Date
1.2 (con't.)	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	
1.3	<b>Modules Added:</b> <b>S-Energy</b> SNXXP-15 SNXXP-10 SNXXM-10 SNXXM-10 (40T) SNXXP-10 (40T) <b>LG</b> LGXXN2W-A5 LGXXN1C-A5 LGXXN1K-A5 LGXXS1C-A5 LGXXS2W-A5 <b>REC</b> RECXXTP2 BLK2 RECXXTP2 BLK RECXXTP2 RECXXTP RECXXTP BLK RECXXPE RECXXPE BLK <b>Canadian Solar</b> CS6X-XXXP (50 psf downforce w/mid-span supports added) <b>LG</b> LGXXN2W-G4 (Max. downforce w/out mid-span support changed to 35 psf)	12/06/2017
1.4	<b>Modules Added:</b> LR6-72-XXXM LR6-72HV-XXXM	1/22/18



Release Notes		
Revision	Reason	Effective Date
1.5	<b>Modules Added:</b> RECXXTP2SB 72 XV RECXXTP2S 72 XV RECXXTP2S 72	4/13/18
1.6	<b>Modules Added:</b> <b>Trina</b> TSM-XXXDD14A(II) TSM-XXXDE14A(II) TSM-XXXPE14A TSM-XXXPD14 <b>Hansol</b> BHSXXTD-AN4 HSXXTD-AN3 HSXXUD-AN1	7/16/18
1.7	<b>Modules Added:</b> <b>Hyundai</b> HiS-MXXXRI HiS-SXXXRI HiS-SXXXKI	5/7/19

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