

## EcoFoot5D™ Install Guide Appendix – UL2703 Qualification

### EcoFoot5D™ High Density 5-Degree Ballasted Racking System

Document No. ES10561

Rev 1.5, May 2019

Ecolibrium Solar's EcoFoot5D™ 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.

EcoFoot5D 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 modules and Type 2 modules. When installing Type 2 modules a Ballast Tray is required. For roofs with lower fire ratings, the existing rating is maintained when EcoFoot5D is used.

EcoFoot5D 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 EcoFoot5D install guide contains instructions for bonding and grounding modules if deviation from standard installation is required. Per UL2703, the EcoFoot5D system creates a continuous bonded structure with all the below listed modules when installed per instructions in the install guide.

Mechanical load testing is underway and will be conducted in 2 ways. First, load testing will be 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. Second, the modules listed below will be 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 5 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 (psf)	Uplift Design Load (psf)
Boviet Solar	BVM6612 P-XXX	42.9	11.8
	BVM6612 P-XXX (BB)		
	BVM6612-M-XXX		
	BVM6612 M-XXX (BB)		
	BVM6610P-XXX	50	11.8
	BVM6610M-XXX		
	BVM6610M (BB)-XXX		
BVM6610P (BB)-XXX			
Canadian Solar	CS6P-XXXM	30	15.1
	CS6P-XXXP		
	CS6X-XXXP	42.8	13.3
	CS6U-XXXP		
	CS6U-XXXM		
	CS6U-XXXP (1500V)		
CS6U-XXXM (1500V)			
ET Solar	ET-M672XXXWW	40	13.4
	ET-M672XXXWB		
	ET-P672XXXWW		
	ET-P672XXXWB		
	ET-M672XXXBB		
	ET-P672XXXBB		
Hansol	HSXXXTD-AN4	35	13.4
	HSXXXTD-AN3		
	HSXXXUD-AN1		
Hanwha Q Cells <small>(continued next page)</small>	Q.PRO BFR-G4 XXX	49.8	13.5
	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		

Manufacturer	Module Series	Downforce Design Load (psf)	Uplift Design Load (psf)
Hanwha Q Cells (con't.)	Q.PEAK BLK G4.1/TAA XXX	49.8	13.5
	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	33	10.2
	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	10.2
	HiS-SXXXTI		
	HiS-MXXXRI	22.8	15
HiS-SXXXRI			
HiS-SXXXKI	45	15	
JKMXXXP-60			
JKMXXXM-48			
JKMSXXXPP-60			
JKMXXXM-60			
JKMXXXM-60-V			
JKMXXXPP-60(Plus)			
JKMXXXPP-60			
JKMXXXPP-60-J4			
JKMXXXPP-60-V			
JKMXXXM-60B	42.9	13.4	
JKMXXXP-72			
JKMXXXPP-72			
JKMXXXM-72(Plus)			
JKMXXXM-72			
JKMXXXPP-72(Plus)			
JKMXXXPP-72-V			
LG (continued next page)	LGXXXN2W-G4	40	13.3
	LGXXXN2W-A5		
	LGXXXN1C-A5	40	12.5
	LGXXXN1K-A5		
	LGXXXS1C-A5		

Manufacturer	Module Series	Downforce Design Load (psf)	Uplift Design Load (psf)		
LG (con't.)	LGXXXS2W-A5	40	12.5		
LONGi	LR6-72-XXXM LR6-72HV-XXXM	40	13.4		
REC Solar	RECXXXTP2 BLK2 RECXXXTP2 BLK RECXXXTP2 RECXXXTP RECXXXTP BLK RECXXXPE RECXXXPE BLK	49.8	15		
	RECXXXTP2SB 72 XV RECXXXTP2S 72 XV RECXXXTP2S 72	35	13		
	ReneSola	JCXXXM-24/Ab JCXXXM-24/Bb	30	13.4	
	S-Energy	SNXXXP-15 SNXXXP-10 SNXXXM-10 SNXXXM-10 (40T) SNXXXP-10 (40T)	30	10	
		SLG-M XXX SLG-P XXX SLG-X XXX SSG-M XXX SSG-P XXX	30	13.1	
		Silfab	SLA-P XXX SLA-X XXX SLA-M XXX SSA-M XXX SSA-P XXX	40	13.3
			SolarWorld	SW Poly Pro SW XXX SW Poly 2.5 SWXXX Sunmodule Plus SW Mono SWXXX Sunmodule Protect SW Mono SWXXX	30
Talesun				TP672P-XXX TP672M-XXX	30
Trina (continued next page)	TSM-XXX PA05.08 TSM-XXXDD14A(II) TSM-XXXDE14A(II)			30 40	15.1 13.4

Manufacturer	Module Series	Downforce Design Load (psf)	Uplift Design Load (psf)
Trina (con't.)	TSM-XXXPE14A	40	13.4
	TSM-XXXPD14		
Yingli	YLXXXP-29b	30	15.1
	YLXXXC-30b		

**Notes:**

- Testing is underway for module data listed as TBD 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.

## Revision History

Revision	Description of Changes	Date
1.0	Initial Release	2017-September-05
1.1	Updated Final Load Ratings Added Tested Modules	2017-November-28
1.2	Added LONGI Modules	2018-January-22
1.3	Added REC Modules	2018-April-13
1.4	Added 4 Trina and 3 Hansol Modules Updated 3 REC Modules	2018-July-16
1.5	Added 3 Hyundai Modules	2019-May-7

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