

SERAPHIM SHINES IN PHOTON LABORATORY TEST



Excellent mechanical loading performance, up to 8000Pa
Easy for installation and compliant for all mounting system



Bankable products



Positive tolerance for each panel, up to 4.99wp



IEC 61701, IEC 72716 Compliant
Ammonia and Salt Mist corrosion testing ensure to adapt to all application conditions



100% in-line
Electroluminescence (EL) tested



Global Performance Insured

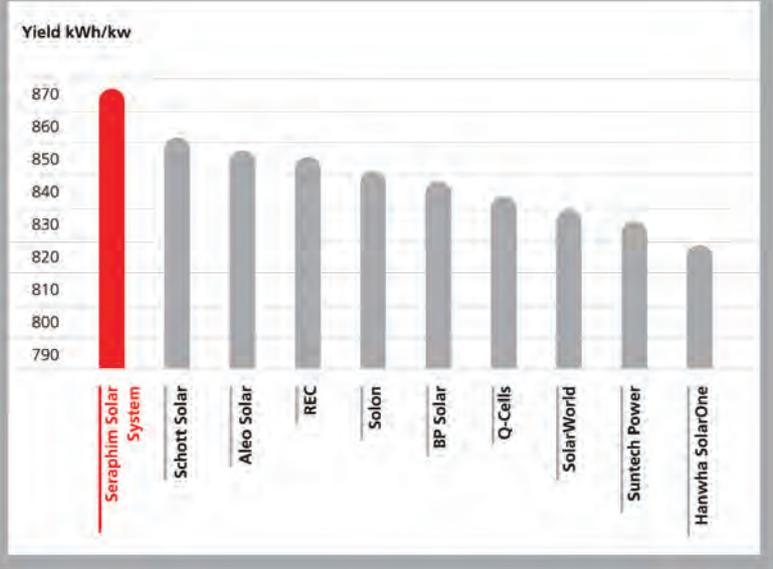
www.seraphim-energy.com



Seraphim Module shine in real life conditions with top performance in Photon Laboratory's test from Jan 2012 to Aug 2012

The test is conducted by the independent laboratory of the leading industry magazine Photon, and is currently the most recognized yield performance test comparing international module brands over several years, during different seasons and in different light conditions.

Since 2005, Photon Lab has operated an ongoing test that monitors the energy yield of solar modules from leading manufacturers. This test compares the energy produced kilowatt of installed power of the participating modules, under identical conditions.



The PHOTON performance ratio logo - sorting the wheat from the chaff

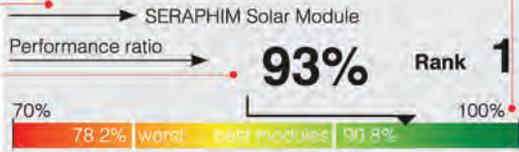
Module data

The company listed in this field is the firm that supplied the device. In most cases, this is the company that produced the module. Some companies order devices from other manufacturers and then rebrand them as their own (in which case, the name of the former is listed, rather than the name of the original manufacturer).

Performance ratio

Performance ratio takes into account the amount of solar electricity produced by the device in relation to the solar irradiance available and the efficiency of the module under standard test conditions (STC). A performance ratio of 100 percent would mean that a module with a 15-percent conversion efficiency, for example, produced 150 kWh under 1,000 kWh per m2 of solar irradiance in a year. Hence, knowing these values allows for a direct comparison between modules that use different cell technologies and have different degrees of efficiency. The best modules in this year's tests had performance ratios close to (or in the case of the top-ranked device, above) 90 percent. Performance ratios under 85 percent are considered relatively poor.

Photon LABORATORY



Yield measurement 2012. 1-8 100 modules in the test

Further improvements to module technology will most likely cause these values to increase in future. Eventually, it is expected that modules will have performance ratios reaching nearly 100 percent.

Yield measurement 2011

This indicates that the yield measurements used to calculate the data in the box were taken during 2011.

Modules in the test

This indicates how many modules successfully completed a full year of testing during the year in question, allowing the reader to gauge the significance of each module's rank.

Ranking

All solar modules that have been installed on the test field since January 2011 and successfully completed a full year of measurements have been ranked based on their performance ratios. Several modules exhibited ratios that were nearly identical, and these modules can be considered virtually indistinguishable with regard to ranking, especially considering measurement uncertainties. Changes in the weather (an unusually cool summer or an unusually sunny winter) can also affect the ranking. What is clear, however, is that a highly ranked module will consistently outperform a poorly ranked module.

Color bars

The color bars depict the rank of performance ratios stretching from 70 to 100 percent. Vertical white lines indicate the respective positions of the worst- and the best-performing modules in the test, with the worst appearing to the left and the best to the right (and the values for each appearing beside them). The position of the module in question in relation to the worst and best performers is indicated by a black triangle.

PHOTON Lab's outdoor module tests: Results of August 2012 yield measurements

Rank	Manufacturer	Model	Cell type	STC power (W)	Performance ratio (%) January - August 2012	Yield (kWh/kW) August 2012	Yield (kWh/kW) January - August 2012
1	Seraphim Solar System	SRP-220-6PB	Multi	226.1	93	148	869.5
2	Siliken	SLK60P6L 230Wp	Multi	229.7	92.1	147.7	861.1
3	Sunerg Solar	XP 60/156-230	Multi	226	92	147.2	860.7
4	ET Solar	ET-P660240	Multi	236.1	92	145.8	860.3
5	NexPower Technology	NT-125AX*2	µc-Si / a-Si	125.4	91.9	155.7	859.5
6	Jinko Solar	JKM190M-72	Mono	191.1	91.8	146.4	858.6
7	Apollo Solar	235G6M	Multi	238	91.6	145.9	856.6
8	Linsun Renewable	SK60P6	Multi	228.3	91.5	146.2	855.4
9	CSG PV Tech	CSG180S1-35/36*5	Mono	184.1	91.4	146.2	855.2
10	Huanghe	HH190(36)M	Mono	190.9	91.3	146.2	853.8
11	Schott Solar*13	SCHOTT PERFORM Poly 235	Multi	239	91.2	146	852.8
12	Nelumbo	NEI 230-3VA	Multi	228.5	91	145	851
13	Himin Clean Energy	HG-190S/Ba	Mono	194.5	90.8	146.5	849.5
14	Aleo Solar	Aleo S_18 225	Multi	230.5	90.8	146	849.3
15	ZN Shine PV-Tech	ZX250(48)MS	Mono	252.3	90.7	145	848.4
16	Chint Solar / Astronergy	CHSM5612M-185	Mono	187.4	90.6	145.9	847
17	REC	Premium 210	Multi	212.2	90.6	146.7	846.9
18	Amerisolar	AS-5M-190W	Mono	195	90.4	145	845.3
19	Solar Modules Nederland	TC245-MO	Mono	246.7	90.4	144.1	845.3
20	Kinmac Solar*10	KSS-6P6A-230	Multi	234.1	90.3	145.7	844.1
21	Kioto Photovoltaics	KPV 210 PE*2	Multi	206.6	90.2	143.8	843.8
22	V-Energy	VE260PV	Multi	234.6	90.2	147.5	843.6
23	Hareon Solar	HR-230P-18/Bb	Multi	230.6	90.2	146.6	843.3
24	ITS Innotech Solar	EcoPlus ITS220ECU5*9	Multi	242.7	90.2	147.1	843.3
25	Solon	SOLO Blue 230/07(225)	Multi	226.9	90.1	145.7	842.9
26	Eurener	PEPV230	Multi	235.3	90	144.7	841.4
27	Risen Energy	SYP185S-M	Mono	191.7	89.9	142.6	841
28	CH Solar	CH Solar 180 mono*2	Mono	184.4	89.9	145.6	840.9
29	Upsolar	UP-M180M	Mono	181.5	89.9	143.5	840.9
30	CNPV Solar	CNPV-185M	Mono	193.8	89.9	145	840.8
31	BP Solar	BP 3220 T	Multi	232.5	89.9	147.6	840.6
32	PV Power Technologies	PVQ3 220	Multi	223.6	89.8	144.2	839.8
33	Sunlink PV	SL220-20M230	Mono	237.9	89.8	143.6	839.5
34	Galaxy Energy	GS260m-96	Mono	252.9	89.7	144	839.3
35	SWAT-International	SWAT-240-PS	Multi	245.1	89.7	143.1	839.3
36	Sunower Light	SF125x125-72-M(180)	Mono	176.6	89.7	144.6	838.5
37	MPrime	M 235P	Multi	240.7	89.6	145.1	838.1
38	CEEG Solar	SST 240-60M	Mono	239	89.6	142.5	837.5
39	Solaria Energia	S6P2G225	Multi	232.7	89.5	142.5	837.3
40	Mage Solar	Mage Powertec	Multi	232	89.5	143.4	837.2
41	Trina Solar	TSM-180DC01	Mono	176.2	89.5	144.4	837.2
42	Conergy	Conergy PowerPlus 220P	Multi	224.2	89.4	143.8	836.5
43	Linuo	LN180(36)M-185	Mono	191.8	89.3	144.6	835.6
44	Eging Photovoltaic	EGM-185	Mono	188.4	89.3	142.8	835.3
45	JZ Solar	JZM 290M-72	Mono	296.9	89.3	145.2	835.3
46	Q-Cells	Q.SMART UF 95	CIGS	97.3	89.3	150	834.9
47	Vikram Solar	ELDORA 220	Multi	233.3	89.2	143.7	834.1
48	Axitec	AC 236P/156-60S	Multi	232.9	89.1	143.4	833
49	SolarWorld	Sunmodule Plus	Multi	212.2*3	88.9	142.4	831.4
50	Frankfurt Solar	FS215W-POLY	Multi	221.3	88.9	142.6	831.3

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Rank	Manufacturer	Model	Cell type	STC power (W)	Performance ratio (%) January - August 2012	Yield (kWh/kW) August 2012	Yield (kWh/kW) January - August 2012
51	Solarbest Energy-Tech	ZSB M190	Mono	186.1	88.8	142	830.6
52	Talesun Solar	TP572M-195	Mono	196.1	88.7	143.1	829.8
53	Daqo New Energy	DQ235PSCa	Multi	238	88.7	144.9	829.7
54	Sunrise Solartech	SRM 180D72-GE	Mono	181.5	88.7	141.6	829.4
55	Topray Solar	TPS105T-180W	Mono	184.8	88.7	145.2	829.4
56	S-Energy	SM-220PA8	Multi	224.4	88.7	143.7	829.1
57	Bisol	BMU-215-2/221	Multi	229.1	88.6	142.1	828.9
58	Bosch Solar	Bosch c-Si M 60 230	Mono	233.2	88.6	141.6	828.7
59	Zentralsolar Deutschland	Genius	Mono	190.6	88.5	143.2	828.1
60	Magi Solar	MGSM-240D-60	Mono	246.1	88.5	141.3	827.9
61	Zytech Engineering	ZT 230P	Multi	230.8	88.5	141.2	827.6
62	Suntech Power	STP205-18/Ud	Multi	213.8	88.5	143.2	827.5
63	Scheuten Solar	Multisol P6-60	Multi	238.1	88.4	141.4	827.2
64	Lilie Energie	Lilie SPL 185	Mono	185.3	88.4	141.8	827.1
65	Yingli Green Energy	YL210P-29b	Multi	214.3	88.4	143.2	827.1
66	Kenmec Mechanical	TKSA-23001	Multi	235	88.4	143.8	827
67	Solarwatt	M220-60 GET AK (230)	Mono	231.5	88.3	141.5	825.5
68	Solargate	SG-2350	Multi	246.3	88.2	143.5	824.8
69	Alex Solar	ALM-190D-24	Mono	187.8	88.1	141.6	824.1
70	Topsolar Green	TSM72-125M-190W	Mono	185.9	88.1	144.6	824
71	Fluitecnik	FTS-220 P	Multi	231.8	88.1	145.9	823.7
72	Sonalis*15	SL-180CE-36M	Mono	185.1	88.1	142.3	823.7
73	China Sunergy	CSUN240-60P	Multi	243.7	88	144.3	823.4
74	Sunage	SAM 96/5	Mono	256.6	88	144.6	822.7
75	Ningbo Solar	Sun Earth	Mono	161.6	87.9	141.8	821.9
76	Hanwha SolarOne*8	SF160 M5-24 (175 W)*2	Mono	174.6*3	87.7	140.6	820.4
77	Helios Technology	H3A230P	Multi	232.2	87.7	144.6	820.2
78	Runda PV	RS230P-60	Multi	237.8	87.7	147	820.1
79	Jetion Solar	JT230(30)P1655x992	Mono	232.4	87.6	143.7	819.5
80	Aide Solar	AD195M5-Aa	Mono	198	87.6	142.6	819.5
81	Sunpeak / Alpeksolar*17	ALP235W*2	Mono	233	87.6	142	819.4
82	Shell Solar	Shell SQ 150-C*2	Mono	155.8*3	87.4	140.5	817.1
83	Luxor Solar	LX-185M/125-72+	Mono	188.4	87.3	141.5	816.9
84	Ferrania Solis	AP 60-230	Multi	228.8	87.3	145.3	816
85	Day4 Energy	Day4 48MC 185	Multi	186.5	86.8	138.5	811.3
86	Perfectenergy	PEM-180/185-72M-SCC	Mono	191.3	86.7	141.3	810.8
87	Win Win Precision	Winaico WSP-230P6	Multi	234.4	86.4	144.2	808.3
88	First Solar	FS-265	CdTe	65.4*3	86.4	143.8	808
89	Solar-Fabrik	Premium L poly (225)	Multi	223.6	86.3	144.8	807
90	Emmvee Photovoltaics	ES-230P60*7	Multi	234	85.4	141.1	798.7
91	Shell Solar	Shell PowerMax	CIS	90.8*3	85.4	140.5	798.7
92	IBC Solar	IBC MonoSol 240 TT	Mono	246	84.5	142.1	790.4
93	Evergreen Solar	EC-120*2	Ribbon	121.0*3	84.4	135.1	789
94	Calrays	CPM 250-A-96	Mono	244	84	140.6	785.1
95	Sovello	SV-X-200-fa1*16	Ribbon	205	83.8	137.5	784.1
96	Canadian Solar	CS6A-170P	Multi	174.4*3	83.8	134.5	783.4
97	Sunways	MHH plus 190 (190 Wp)*2	Multi	199.5*3	83.1	136	777.3
98	Isofoton	I-110/24*2	Mono	102.5*3	83	136.3	776.1
99	Kyocera	KC170GT-2*2	Multi	178.4*3	82.5	133.9	771.3
100	ASE (now with Schott Solar)	ASE-300-DG-FT (300 W)*2	Ribbon	308.1*3	82	135.6	766.9