

**SUMMARY
OF SRCC
CERTIFIED
SOLAR
COLLECTOR
AND
WATER HEATING
SYSTEM RATINGS**

January 21, 2009



www.solar-rating.org

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SRCC RATING AND CERTIFICATION PROGRAMS

The Solar Rating & Certification Corporation (SRCC) is an independent, non-profit organization which certifies and rates the performance of solar energy equipment. The SRCC was formed in 1980.

The SRCC currently operates two solar certification programs: collector certification (OG 100), water heating system certification (OG 300). The collector certification program (OG 100) applies to that part of a solar energy system which is exposed to the sun and collects the sun's heat. The collectors can be used to heat water, buildings, and for other purposes. The solar water heating system certification program (OG 300) deals with the entire solar system (collectors, controls, storage tanks, heat exchangers, pumps, etc.) used to heat domestic hot water using the sun. This program integrates results of collector tests and system tests with computer simulations and determines whether systems meet minimum standards for system durability, reliability, safety and operation. It also evaluates factors affecting total system design, installation, maintenance and service.

This summary contains ratings for solar collectors and heating systems which have been certified and rated by SRCC. Additional information is contained in the full Directory of SRCC Certified Solar Collector and Water Heating System Ratings. Contact the SRCC office in Cocoa, FL for ordering information.

The information in this summary provides reliable and comparable data for solar water heating collectors and systems you may be considering buying. The rating information is a helpful tool for comparing the efficiency of the various solar systems on the market. Remember, though, that not all solar energy systems are tested and rated as a "package" or a system. Many systems you consider may have only the collectors rated by SRCC. While you can, and should, compare collector ratings, you cannot compare collector ratings with system ratings. The reason for this is two-fold. First, the collector rating shows the performance of one component in the solar package while the system rating shows the performance of an entire solar package. Second, each rating, whether a collector rating or a system rating, is developed using a separate set of assumed conditions. Therefore, this summary is divided into two sections: collectors and systems. All collectors and systems which have been certified by SRCC will bear the SRCC label, which is your assurance that an independent party has verified the performance and basic durability of the solar product you are considering.

Both the full directory and this summary contain "performance" information about the solar collectors and systems. "Performance" data relates to the energy output of the collector or system. The SRCC performance information contained in this summary provides a way to compare the **relative** performance of different solar water heating collectors and systems, not the **actual** performance you can expect from a given collector or system. This is because the collectors and systems are rated under standard laboratory conditions which are certain to be different from those in your home. **Think of the SRCC ratings as you do the MPG ratings for cars -- a benchmark, but not necessarily the same performance you will experience.** Remember, too, that performance (or energy output) is only one criterion in choosing a solar energy collector or system. Quality of installation, cost, availability of service and parts, and the expected life of the equipment are also important points to consider. Equipment which is well designed and well built, but poorly installed, cannot perform according to the manufacturer's specifications.

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COLLECTORS CERTIFIED UNDER OG100

HOW COLLECTORS ARE CERTIFIED UNDER THE OG 100 PROTOCOL

Each time SRCC allows a solar manufacturer to attach the SRCC label to its product, very specific steps have been followed to assure consumers that the product meets SRCC's approval and that the performance information provided to you is correct. First, SRCC selects a solar collector at random from the manufacturer's facility. The collector is then sent for testing to an independent laboratory accredited by SRCC. When the collector is received by the lab, it is subjected to a variety of durability tests to reveal any leaks, to check the integrity of construction, and to assess the collector's resistance to changes in water temperature. Following the durability tests, the energy output of the collector is measured to determine the performance of the collector under a specified set of conditions. These measurements result in the performance equations which are used to calculate performance ratings. Finally, when the testing is complete, the lab partially disassembles the collector and inspects it for any hidden problems.

SRCC then reviews the results and calculates of the ratings which appear in the directory. The SRCC also checks the collector design for reliability and durability. When the collector is certified, the manufacturer is notified and required to begin affixing the SRCC label to the solar collector. The manufacturer must provide a copy of the Certification Award with each certified collector.

TYPES OF SOLAR COLLECTORS

As you shop for a solar collector, you may see several different types. They are:

1. **Unglazed flat-plate liquid-type collectors** are those in which a liquid is heated by the sun in a stationary collector which does not have glass or other transparent covering. These collectors are commonly used in swimming pool heating systems.
2. **Glazed flat-plate liquid-type collectors** are those in which a liquid is heated by the sun in a stationary collector which has a cover of glass or other transparent material. They are the most common type of collectors and are often used for domestic water heating and space heating systems.
3. **Air-type collectors** are those in which the sun heats air rather than a liquid in the collector. They are most commonly used for space heating applications.

All three types of collectors work well and can be compared with others of the same type, using the ratings in this directory.

HOW TO USE THE OG 100 SUMMARY

SRCC has divided the collectors in this section of the directory according to the two types: unglazed and glazed. A performance rating under 15 different weather and operating conditions is published in the full SRCC directory. This summary lists the most commonly used rating for each collector type. The collector with the higher rating generally produces more energy than those with lower ratings. However, such a comparison should not be the only basis for your choice of a solar energy system. The remainder of the system and the quality of the installation are also critically important factors in how well your solar system works, and how much energy and money you save. Remember, too, that the energy output of the collectors in the directory has been measured under test conditions, which are almost certainly not the same as the collector will be subjected to on your home.

COMPARING COLLECTOR EFFICIENCY AND COST

With the ratings discussed above, it is easy to compare the energy output of one collector to another. It can be difficult however, to take into account the price of the different collectors.

One method is to compare the energy output for each dollar spent on different collectors. Or, in other words, how many Btu (or MJ) does a dollar buy if spent on Collector #1 or on Collector #2? This question can be answered by dividing the energy output by the cost of the collector. For example, you are considering a solar water heating application. Collector

#1 has a rating in Category C (for solar water heating) of 29 MJ (per collector per day) or 21,000 Btu (per collector per day). Collector #1 sells for \$387. Collector #2 is rated at 35 MJ or 33,000 Btu. It sells for \$675. Thus:

Collector #1

$$\frac{29 \text{ MJ}}{\$ 387} = 0.07 \text{ MJ} / \$ \quad \text{or} \quad \frac{21,000 \text{ Btu}}{\$ 387} = 54 \text{ Btu} / \$$$

Collector #2

$$\frac{35 \text{ MJ}}{\$ 675} = 0.05 \text{ MJ} / \$ \quad \text{or} \quad \frac{33,000 \text{ Btu}}{\$ 675} = 49 \text{ Btu} / \$$$

Collector #1 is the better buy, based on performance under the test conditions alone. The higher the number of MJ's or Btu's per dollar, the more cost-effective the collector is...all other things being equal. Remember, though, that the design and quality of the rest of the system and the installation are also critical to a good solar energy system.

RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
ACR Solar International	10-01	Skyline	0.93	10.0	Selective Coating	0.602	-3.76	-0.663	9	8
ACR Solar International	20-01	Skyline	1.87	20.1	Selective Coating	0.604	-3.73	-0.657	18	17
Alternate Energy Technologies	AE-21	Alternate Energy	1.93	20.8	Selective Coating	0.706	-4.91	-0.865	22	21
Alternate Energy Technologies	AE-21E	American Energy	1.93	20.7	Moderately Selective Black Paint	0.660	-6.37	-1.123	20	19
Alternate Energy Technologies	AE-24	Alternate Energy	2.21	23.8	Selective Coating	0.706	-4.91	-0.865	25	24
Alternate Energy Technologies	AE-24E	American Energy	2.21	23.8	Moderately Selective Black Paint	0.655	-6.37	-1.123	23	21
Alternate Energy Technologies	AE-26	Alternate Energy	2.35	25.4	Selective Coating	0.706	-4.91	-0.865	27	25
Alternate Energy Technologies	AE-26E	American Energy	2.36	25.4	Moderately Selective Black Paint	0.655	-6.37	-1.123	24	23
Alternate Energy Technologies	AE-28	Alternate Energy	2.60	28.0	Selective Coating	0.706	-4.91	-0.865	29	28
Alternate Energy Technologies	AE-28E	American Energy	2.60	28.0	Moderately Selective Black Paint	0.655	-6.37	-1.123	26	25
Alternate Energy Technologies	AE-32	Alternate Energy	2.96	31.9	Selective Coating	0.706	-4.91	-0.865	33	32
Alternate Energy Technologies	AE-32E	American Energy	2.97	31.9	Moderately Selective Black Paint	0.655	-6.37	-1.123	30	29
Alternate Energy Technologies	AE-40	Alternate Energy	3.70	39.8	Selective Coating	0.706	-4.91	-0.865	42	40
Alternate Energy Technologies	AE-40E	American Energy	3.70	39.8	Moderately Selective Black Paint	0.655	-6.37	-1.123	38	36
Alternate Energy Technologies	AE-50	Alternate Energy	4.66	50.2	Selective Coating	0.706	-4.91	-0.865	53	50
Alternate Energy Technologies	AE-56	Alternate Energy	5.18	55.7	Selective Coating	0.706	-4.91	-0.865	58	55
Alternate Energy Technologies	MSC-21	Morning Star	2.00	21.5	Selective Coating	0.706	-4.91	-0.865	23	21
Alternate Energy Technologies	MSC-21E	Morning Star	2.00	21.5	Moderately Selective Black Paint	0.655	-6.37	-1.123	20	19
Alternate Energy Technologies	MSC-24	Morning Star	2.28	24.5	Selective Coating	0.706	-4.91	-0.865	26	24
Alternate Energy Technologies	MSC-24E	Morning Star	2.27	24.4	Moderately Selective Black Paint	0.655	-6.37	-1.123	23	22
Alternate Energy Technologies	MSC-26	Morning Star	2.42	26.0	Selective Coating	0.706	-4.91	-0.865	27	26
Alternate Energy Technologies	MSC-26E	Morning Star	2.41	25.9	Moderately Selective Black Paint	0.655	-6.37	-1.123	24	23
Alternate Energy Technologies	MSC-28	Morning Star	2.66	28.7	Selective Coating	0.706	-4.91	-0.865	30	29
Alternate Energy Technologies	MSC-28E	Morning Star	2.65	28.5	Moderately Selective Black Paint	0.655	-6.37	-1.123	27	26
Alternate Energy Technologies	MSC-32	Morning Star	3.03	32.7	Selective Coating	0.706	-4.91	-0.865	34	32
Alternate Energy Technologies	MSC-32E	Morning Star	3.02	32.5	Moderately Selective Black Paint	0.655	-6.37	-1.123	31	29
Alternate Energy Technologies	MSC-40	Morning Star	3.92	42.2	Selective Coating	0.706	-4.91	-0.865	44	42

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Certification must be renewed annually. For current status contact:

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RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
Alternate Energy Technologies	MSC-40E	Morning Star	3.76	40.5	Moderately Selective Black Paint	0.655	-6.37	-1.123	38	36
Alternate Energy Technologies	ST-21E	Starfire	1.97	21.2	Moderately Selective Black Paint	0.674	-6.02	-1.061	20	19
Alternate Energy Technologies	ST-40E	Starfire	3.58	38.5	Moderately Selective Black Paint	0.674	-6.02	-1.061	36	35
American Solar Works Holdings	ASW52B	American Solar Works	2.86	30.8	Sputtered aluminium nitride	0.481	-1.65	-0.291	23	22
American Solar Works Holdings	ASW52B Stretch	American Solar Works	3.90	42.0	Sputtered aluminium nitride	0.481	-1.65	-0.291	31	29
American Solar Works Holdings	ASW-58A	American Solar Works	3.52	37.9	Aluminum Nitride	0.481	-1.33	-0.235	33	31
Apricus Solar Co., Ltd.	AP-10	Apricus	1.34	14.4	Sputtered aluminum nitride	0.418	-1.17	-0.206	12	12
Apricus Solar Co., Ltd.	AP-20	Apricus	2.71	29.2	Sputtered aluminum nitride	0.418	-1.17	-0.206	25	23
Apricus Solar Co., Ltd.	AP-22	Apricus	2.98	32.1	Sputtered aluminum nitride	0.418	-1.17	-0.206	27	26
Apricus Solar Co., Ltd.	AP-30	Apricus	4.05	43.6	Sputtered aluminum nitride	0.418	-1.17	-0.206	37	35
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 10-10AS/AB	SUNDA	1.68	18.1	Sputtered aluminum nitrate	0.462	-1.57	-0.276	15	14
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 10-20AS/AB	SUNDA	3.39	36.5	Sputtered aluminum nitrate	0.462	-1.57	-0.276	30	28
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 1-16	SUNDA	3.99	43.0	Sputtered aluminium nitride	0.529	-1.70	-0.299	37	35
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 1-8	SUNDA	2.00	21.5	Sputtered aluminium nitride	0.529	-1.70	-0.299	19	18
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 2-16	SUNDA	4.10	44.2	Sputtered Selective	0.628	-1.72	-0.303	51	48
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 2-8	SUNDA	2.03	21.9	Sputtered Selective	0.628	-1.72	-0.303	25	24
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 5-16 AS/AB	SUNDA	4.10	44.1	Sputtered aluminium nitride	0.492	-1.92	-0.339	38	36
Beijing Sunda Solar Energy Technology Co Ltd	SEIDO 5-8 AS/AB	SUNDA	2.03	21.8	Sputtered aluminium nitride	0.492	-1.92	-0.339	19	18
Bosch Thermotechnology Corp.	FKB-1	Bosch	2.40	25.8	Moderately Selective Black Paint	0.703	-4.21	-0.742	28	27
Bosch Thermotechnology Corp.	FKC-1 s+w	Bosch	2.41	26.0	Black Chrome	0.723	-4.44	-0.782	29	27
Bosch Thermotechnology Corp.	SKN 3.0-s+w (Vert-Horiz)	Buderus	2.41	26.0	Black Chrome	0.723	-4.44	-0.782	29	27
Bosch Thermotechnology Corp.	SKS 4.0-s+w (Vert-Horiz)	Buderus	2.41	26.0	Selective Coating	0.715	-3.97	-0.700	30	28

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RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
BTF, Ltd.	SP-20	Solar Patriot	3.08	33.1	Sputtered aluminum nitride	0.345	-1.15	-0.203	25	23
Bubbling Springs Solar, Inc.	MS 29	Main Stream	2.92	31.5	Moderately Selective Black Paint	0.707	-5.12	-0.903	31	29
Bubbling Springs Solar, Inc.	MS 32	Main Stream	2.98	32.0	Moderately Selective Black Paint	0.708	-5.13	-0.904	31	30
Bubbling Springs Solar, Inc.	MS 40	Main Stream	3.71	39.9	Moderately Selective Black Paint	0.711	-5.14	-0.905	39	37
Caleffi Solar	NAS10406	SolarFlat	2.35	25.4	Selective Coating	0.706	-4.91	-0.865	27	25
Caleffi Solar	NAS10408	SolarFlat	2.96	31.9	Selective Coating	0.706	-4.91	-0.865	33	32
Caleffi Solar	NAS10410	SolarFlat	3.70	39.8	Selective Coating	0.706	-4.91	-0.865	42	40
Chromagen	CR-BC	Chromagen	2.05	22.1	Black Chrome	0.669	-4.32	-0.761	22	21
Chromagen	CR-P	Chromagen	2.05	22.1	Black Paint	0.686	-5.34	-0.941	22	21
Energy Conservation Products and Services	6000	Solarway	3.00	32.3	None	0.422	-6.01	-1.059	15	14
Energy Laboratories, Inc.	SE-21		2.03	21.9	Selective Coating	0.704	-4.49	-0.790	24	22
Energy Laboratories, Inc.	SE-24		2.31	24.9	Selective Coating	0.704	-4.49	-0.790	27	25
Energy Laboratories, Inc.	SE-28		2.51	27.0	Selective Coating	0.704	-4.49	-0.790	29	28
Energy Laboratories, Inc.	SE-32		2.87	30.9	Selective Coating	0.704	-4.49	-0.790	33	32
Energy Laboratories, Inc.	SE-40		3.58	38.6	Selective Coating	0.704	-4.49	-0.790	42	39
Enerworks, Inc.	COL-4X8-NL-SG1-SH10US	Commercial Collector	2.87	30.9	Vapor Deposition Selective Coating	0.768	-4.03	-0.711	39	37
Enerworks, Inc.	COL-4x8-TL-SG1-SD10US	Residential Collector	2.87	30.9	Vapor Deposition Selective Coating	0.726	-5.11	-0.901	33	32
Environmental Solar Systems	SM-14	Sun Mate	1.74	18.7	Selective Coating	0.580	-5.14	-0.905	16	15
G.S. Inc.	EOS-S10	EOS Solar	1.58	17.0	Selective	0.273	-1.35	-0.237	9	9
G.S. Inc.	EOS-S20	EOS Solar	3.09	33.2	Selective	0.273	-1.35	-0.237	18	17
G.S. Inc.	EOS-S30	EOS Solar	4.65	50.0	Selective	0.273	-1.35	-0.237	27	26
General Solar Systems GmbH	SK500L	SK500	2.57	27.7	Selective Coating	0.686	-3.59	-0.633	30	28
General Solar Systems GmbH	SK500N	SK500	2.57	27.7	Selective Coating	0.686	-3.59	-0.633	30	28
Genersys PLC	1000-10	Genersys	2.04	21.9	Metallic Oxide	0.591	-3.99	-0.704	20	19
Heat Transfer Products	HP-30SC	HTP-Evacuated Tube	4.05	43.6	Sputtered aluminum nitride	0.418	-1.17	-0.206	37	35
Heliodyne, Inc.	336 001	Gobi	2.49	26.8	Sputtered Selective	0.731	-4.03	-0.710	30	28
Heliodyne, Inc.	336 013	Gobi	2.49	26.8	Black Chrome	0.708	-4.54	-0.801	28	26
Heliodyne, Inc.	404 001	Gobi	1.52	16.4	Sputtered Selective	0.718	-4.16	-0.733	18	17
Heliodyne, Inc.	406 001	Gobi	2.50	26.9	Sputtered Selective	0.732	-4.19	-0.739	30	28
Heliodyne, Inc.	406 002	Gobi	2.50	26.9	Black Paint	0.726	-6.08	-1.071	28	26
Heliodyne, Inc.	406 013	Gobi	2.50	26.9	Black Chrome	0.711	-4.56	-0.804	28	26
Heliodyne, Inc.	408 001	Gobi	2.99	32.2	Sputtered Selective	0.736	-4.21	-0.741	36	34
Heliodyne, Inc.	408 002	Gobi	3.00	32.3	Black Paint	0.726	-6.08	-1.071	34	32

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RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
Heliodyne, Inc.	408 013	Gobi	2.99	32.2	Black Chrome	0.715	-4.74	-0.835	33	32
Heliodyne, Inc.	410 001	Gobi	3.73	40.2	Sputtered Selective	0.739	-4.21	-0.742	45	43
Heliodyne, Inc.	410 002	Gobi	3.73	40.1	Black Paint	0.726	-6.08	-1.071	42	40
Heliodyne, Inc.	410 013	Gobi	3.73	40.2	Black Chrome	0.718	-4.75	-0.837	42	40
Integrated Solar, LLC	Radco 308C-HP		2.20	23.7	Black Chrome	0.778	-4.96	-0.875	28	26
Integrated Solar, LLC	Radco 308P-HP		2.20	23.7	Flat Black Paint	0.764	-7.51	-1.323	24	23
Integrated Solar, LLC	Radco 408C-HP		3.00	32.3	Black Chrome	0.779	-4.77	-0.841	38	36
Integrated Solar, LLC	Radco 408P-HP		3.00	32.3	Flat Black Paint	0.768	-7.24	-1.276	32	30
Integrated Solar, LLC	Radco 410C-HP		3.71	39.9	Black Chrome	0.779	-4.77	-0.841	47	45
Integrated Solar, LLC	Radco 410P-HP		3.71	39.9	Flat Black Paint	0.768	-7.24	-1.276	40	38
Integrated Solar, LLC	Radco 412C-HP		4.49	48.3	Black Chrome	0.779	-4.77	-0.841	57	54
Integrated Solar, LLC	Radco 412P-HP		4.49	48.3	Flat Black Paint	0.768	-7.24	-1.276	49	46
Marathon International	S-SPC 18	Baxi	1.92	20.6	Selective Coating	0.696	-4.46	-0.785	21	20
Mr. Sun Solar	AE-40	Sol-Reliant	3.70	39.8	Selective Coating	0.706	-4.91	-0.865	42	40
Mr. Sun Solar	AE-50	Sol-Reliant	4.66	50.2	Selective Coating	0.706	-4.91	-0.865	53	50
Mr. Sun Solar	AE-56	Sol-Reliant	5.18	55.7	Selective Coating	0.706	-4.91	-0.865	58	55
Oventrop Corporation	OV 10-10 AS/AB	Oventrop Solar	1.68	18.1	Sputtered aluminum nitrate	0.462	-1.57	-0.276	15	14
Oventrop Corporation	OV 10-20 AS/AB	Oventrop Solar	3.39	36.5	Sputtered aluminum nitrate	0.462	-1.57	-0.276	30	28
Oventrop Corporation	OV 5-16 AS/AB	Oventrop Solar	4.10	44.1	Sputtered aluminium nitride	0.492	-1.92	-0.339	38	36
Oventrop Corporation	OV 5-8 AS/AB	Oventrop Solar	2.03	21.8	Sputtered aluminium nitride	0.492	-1.92	-0.339	19	18
Pacific West Solar	FS410	Freeze Safe	3.88	41.8	Moderately Selective	0.616	-4.46	-0.785	36	34
Power Partners, Inc.	10-01	Skyline	0.93	10.0	Selective Coating	0.602	-3.76	-0.663	9	8
Power Partners, Inc.	20-01	Skyline	1.87	20.1	Selective Coating	0.604	-3.73	-0.657	18	17
PVT Solar, Inc.	CL-T-370	Cleanline-Thermal	34.49	371.3	Black Chrome	0.515	-6.36	-1.121	222	211
R&R Solar Supply	EPI-308CU(3'x 7')	Copper Star 21	1.90	20.5	Moderately Selective Black Paint	0.708	-6.11	-1.077	21	20
R&R Solar Supply	EPI-308CU(3'x 8')	Copper Star 24	2.17	23.3	Moderately Selective Black Paint	0.708	-6.11	-1.077	24	22
R&R Solar Supply	EPI-308CU(4'x 8')	Copper Star 32	2.92	31.4	Moderately Selective Black Paint	0.708	-6.11	-1.077	32	30
R&R Solar Supply	EPI-308SS(3'x7')	Sunlast 21	1.90	20.5	Moderately Selective Black Paint	0.708	-6.11	-1.077	21	20
R&R Solar Supply	EPI-308SS(3'x8')	Sunlast 24	2.17	23.3	Moderately Selective Black Paint	0.708	-6.11	-1.077	24	22

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Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
R&R Solar Supply	EPI-308SS(4'x8')	Sunlast 32	2.92	31.4	Moderately Selective Black Paint	0.708	-6.11	-1.077	32	30
R&R Solar Supply	Sunpro 21	Sunpro	1.90	20.5	Moderately Selective Black Paint	0.708	-6.11	-1.077	21	20
R&R Solar Supply	Sunpro 24	Sunpro	2.17	23.3	Moderately Selective Black Paint	0.708	-6.11	-1.077	24	23
R&R Solar Supply	Sunpro 32	Sunpro	2.92	31.4	Moderately Selective Black Paint	0.708	-6.11	-1.077	32	30
R&R Solar Supply	Sunpro 40	Sunpro	3.64	39.2	Moderately Selective Black Paint	0.708	-6.11	-1.077	40	38
Rheem Water Heaters	RS21-BC	Rheem	1.98	21.3	Black Chrome	0.759	-5.93	-1.045	24	23
Rheem Water Heaters	RS21-BP	Rheem	1.98	21.3	Polyester Flat Black Paint	0.772	-8.36	-1.473	23	22
Rheem Water Heaters	RS21-SC	Rheem	1.98	21.4	Titanium oxide	0.750	-4.87	-0.858	24	23
Schuco USA L.P.	Compact S	Compact	2.31	24.9	Sputtered cermet	0.715	-3.99	-0.704	28	27
Schuco USA L.P.	V, H, LA	Premium	2.70	29.1	Sputtered cermet	0.718	-4.28	-0.754	33	31
Schuco USA L.P.	V, LA, Plus	Slimline	2.31	24.9	Sputtered cermet	0.715	-3.99	-0.704	28	27
Sealed Air Corporation	FW-48		4.40	47.4	None	0.739	-8.21	-1.447	44	42
Silicon Solar Inc.	20EVT	SunMaxx	3.44	37.0	Sputtered aluminium nitride	0.376	-1.32	-0.233	30	28
Solahart Industries	Bt	Solahart	1.98	21.4	Titanium oxide	0.750	-4.87	-0.858	24	23
Solahart Industries	J	Solahart	1.98	21.3	Polyester Flat Black Paint	0.772	-8.36	-1.473	23	22
Solahart Industries	Kf	Solahart	1.98	21.3	Black Chrome	0.759	-5.93	-1.045	24	23
Solahart Industries	L	Solahart	1.98	21.3	Polyester Flat Black Paint	0.625	-7.47	-1.316	16	15
Solahart Industries	M	Solahart	1.98	21.3	Black Chrome	0.625	-4.53	-0.798	20	19
Solaqua Power & Art	GM-10	Solaqua - Gomon	2.09	22.5	Titanium oxide	0.350	-1.65	-0.291	12	12
Solaqua Power & Art	GM-20	Solaqua - Gormon	4.22	45.4	Titanium oxide	0.350	-1.65	-0.291	25	24
Solar Development, Inc.	SD8-21	Solar Development	1.93	20.8	Selective Coating	0.706	-4.91	-0.865	22	21
Solar Development, Inc.	SD8-26	Solar Development	2.35	25.4	Selective Coating	0.706	-4.91	-0.865	27	25
Solar Development, Inc.	SD8-28	Solar Development	2.60	28.0	Selective Coating	0.706	-4.91	-0.865	29	28
Solar Development, Inc.	SD8-32	Solar Development	2.96	31.9	Selective Coating	0.706	-4.91	-0.865	33	32
Solar Development, Inc.	SD8-40	Solar Development	3.70	39.8	Selective Coating	0.706	-4.91	-0.865	42	40
Solar Energy 4 U llc.	SK500L	Sonnenkraft	2.57	27.7	Selective Coating	0.686	-3.59	-0.633	30	28
Solar Energy 4 U llc.	SK500N	Sonnenkraft	2.57	27.7	Selective Coating	0.686	-3.59	-0.633	30	28
Solar Panels Plus	SPP-22	SPP	3.52	37.9	Aluminum Nitride	0.481	-1.33	-0.235	33	31
Solar Panels Plus	SPP-30	SPP	4.81	51.8	Aluminum Nitride	0.481	-1.33	-0.235	45	43
Solar Skies Mfg, LLC	NSC-21	North Star	2.00	21.5	Selective Coating	0.706	-4.91	-0.865	23	21

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Solar Skies Mfg, LLC	NSC-24	North Star	2.28	24.5	Selective Coating	0.706	-4.91	-0.865	26	24
Solar Skies Mfg, LLC	NSC-26	North Star	2.42	26.0	Selective Coating	0.706	-4.91	-0.865	27	26
Solar Skies Mfg, LLC	NSC-28	North Star	2.66	28.7	Selective Coating	0.706	-4.91	-0.865	30	29
Solar Skies Mfg, LLC	NSC-32	North Star	3.03	32.7	Selective Coating	0.706	-4.91	-0.865	34	32
Solar Skies Mfg, LLC	NSC-40	North Star	3.92	42.2	Selective Coating	0.706	-4.91	-0.865	44	42
Solar Skies Mfg, LLC	SS-21	Solar Skies	1.93	20.8	Selective Coating	0.706	-4.91	-0.865	22	21
Solar Skies Mfg, LLC	SS-24	Solar Skies	2.21	23.8	Selective Coating	0.706	-4.91	-0.865	25	24
Solar Skies Mfg, LLC	SS-26	Solar Skies	2.35	25.4	Selective Coating	0.706	-4.91	-0.865	27	25
Solar Skies Mfg, LLC	SS-28	Solar Skies	2.60	28.0	Selective Coating	0.706	-4.91	-0.865	29	28
Solar Skies Mfg, LLC	SS-32	Solar Skies	2.96	31.9	Selective Coating	0.706	-4.91	-0.865	33	32
Solar Skies Mfg, LLC	SS-40	Solar Skies	3.70	39.8	Selective Coating	0.706	-4.91	-0.865	42	40
Solar Skies Mfg, LLC	SS-50	Solar Skies	4.66	50.2	Selective Coating	0.706	-4.91	-0.865	53	50
Solar Thermal Systems	STS 410BC	Solar Thermal Systems	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
Solar Thermal Systems	STS 410BP	Solar Thermal Systems	3.80	40.9	Moderately Selective Black Paint	0.682	-4.54	-0.800	43	40
Solar Thermal Systems	STS 48BC	Solar Thermal Systems	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35
Solar Thermal Systems	STS 48BP	Solar Thermal Systems	3.05	32.8	Moderately Selective Black Paint	0.682	-4.54	-0.800	34	32
Solargenix Energy, LLC	WS0503	Winston Series CPC	2.24	24.1	Moderately Selective Black Paint	0.600	-5.68	-1.001	19	18
Solarhot	S-SC-126P26	Solarhot	2.45	26.3	Vapor Deposition Selective Coating	0.684	-3.87	-0.682	27	26
Solarhot	S-SC-126P32	Solarhot	2.97	32.0	Vapor Deposition Selective Coating	0.685	-3.86	-0.681	33	31
Solarhot	S-SC-126P40	Solarhot	3.66	39.4	Vapor Deposition Selective Coating	0.688	-3.88	-0.683	41	38
Solarhot	S-SC-126S26	Solarhot	2.45	26.4	Flat Black Paint	0.663	-6.53	-1.152	23	21
Solarhot	S-SC-126S32	Solarhot	2.97	32.0	Flat Black Paint	0.665	-6.54	-1.152	27	26
Solar-Max Heating Systems, Inc.	MSM-101		2.95	31.7	Black Chrome	0.417	-6.30	-1.110	14	14
Solene	SLCO-30	Solene-Corona	2.28	24.5	Black Chrome	0.782	-4.60	-0.811	28	27
Solene	SLCO-32	Solene-Corona	2.95	31.8	Black Chrome	0.785	-4.60	-0.810	36	35
Solene	SLCO-32P	Solene-Corona	2.95	31.8	Flat Black Paint	0.679	-6.22	-1.096	28	27
Solene	SLCO-40	Solene-Corona	3.61	38.9	Black Chrome	0.787	-4.60	-0.810	45	42

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Solene	SLCO-40P	Solene-Corona	3.63	39.0	Flat Black Paint	0.672	-6.14	-1.081	34	32
Solene	SLCR-30	Solene/Chromagen	2.81	30.3	Black Chrome	0.735	-5.37	-0.945	35	33
Solene	SLCR-32	Solene/Chromagen	2.97	32.0	Black Chrome	0.735	-5.37	-0.945	37	35
Solene	SLCR-40	Solene/Chromagen	3.72	40.1	Black Chrome	0.735	-5.37	-0.945	46	44
Stiebel Eltron	Sol 25 Plus	Stiebel Eltron	2.73	29.4	Sputtered titanium nitride	0.660	-4.29	-0.755	32	30
SunBank Solar	SB10	SunBank	0.93	10.0	Selective Coating	0.602	-3.76	-0.663	9	8
SunBank Solar	SB20	SunBank	1.87	20.1	Selective Coating	0.604	-3.73	-0.657	18	17
SunEarth, Inc.	EC-21	Empire	1.97	21.3	Black Chrome	0.735	-4.04	-0.712	24	22
SunEarth, Inc.	EC-24	Empire	2.30	24.7	Black Chrome	0.735	-4.04	-0.712	27	26
SunEarth, Inc.	EC-32	Empire	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35
SunEarth, Inc.	EC-32-1.5	Empire	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35
SunEarth, Inc.	EC-40	Empire	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
SunEarth, Inc.	EC-40-1.5	Empire	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
SunEarth, Inc.	EP-20	Empire	1.83	19.7	Moderately Selective Black Paint	0.682	-4.54	-0.800	21	19
SunEarth, Inc.	EP-21	Empire	1.97	21.2	Moderately Selective Black Paint	0.682	-4.54	-0.800	22	21
SunEarth, Inc.	EP-24	Empire	2.29	24.7	Moderately Selective Black Paint	0.682	-4.54	-0.800	26	24
SunEarth, Inc.	EP-32	Empire	3.05	32.8	Moderately Selective Black Paint	0.682	-4.54	-0.800	34	32
SunEarth, Inc.	EP-40	Empire	3.80	40.9	Moderately Selective Black Paint	0.682	-4.54	-0.800	43	40
SunEarth, Inc.	IC-24	Imperial	2.30	24.7	Black Chrome	0.735	-4.04	-0.712	27	26
SunEarth, Inc.	IC-32	Imperial	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35
SunEarth, Inc.	IC-40	Imperial	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
SunEarth, Inc.	IP-24	Imperial	2.30	24.8	Moderately Selective Black Paint	0.682	-4.54	-0.800	26	24
SunEarth, Inc.	IP-32	Imperial	3.06	33.0	Moderately Selective Black Paint	0.682	-4.54	-0.800	34	33
SunEarth, Inc.	IP-40	Imperial	3.81	41.0	Moderately Selective Black Paint	0.682	-4.54	-0.800	43	41
SunEarth, Inc.	SB-24-0.75	SunBelt	2.29	24.7	Flat Black Paint	0.661	-6.58	-1.159	22	21
SunEarth, Inc.	SB-32-0.75	SunBelt	3.06	32.9	Flat Black Paint	0.673	-6.67	-1.176	30	28
SunEarth, Inc.	SB-40-0.75	SunBelt	3.80	40.9	Flat Black Paint	0.681	-6.74	-1.188	37	35
SunEarth, Inc.	SC-24	Sunwise	2.30	24.7	Black Chrome	0.735	-4.04	-0.712	27	26
SunEarth, Inc.	SC-32	Sunwise	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35
SunEarth, Inc.	SC-40	Sunwise	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
SunEarth, Inc.	SP-24	Sunwise	2.29	24.7	Moderately Selective Black Paint	0.682	-4.54	-0.800	26	24
SunEarth, Inc.	SP-32	Sunwise	3.05	32.8	Moderately Selective Black Paint	0.682	-4.54	-0.800	34	32
SunEarth, Inc.	SP-40	Sunwise	3.80	40.9	Moderately Selective Black Paint	0.682	-4.54	-0.800	43	40
SunEarth, Inc.	SSC-21	SolarStar	1.97	21.3	Black Chrome	0.735	-4.04	-0.712	24	22
SunEarth, Inc.	SSC-24	SolarStar	2.30	24.7	Black Chrome	0.735	-4.04	-0.712	27	26
SunEarth, Inc.	SSC-32	SolarStar	3.05	32.8	Black Chrome	0.753	-4.11	-0.724	37	35

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RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
SunEarth, Inc.	SSC-40	SolarStar	3.80	40.9	Black Chrome	0.758	-4.13	-0.727	47	44
SunEarth, Inc.	SSP-21	SolarStar	1.86	20.0	Moderately Selective Black Paint	0.682	-4.54	-0.800	21	20
SunEarth, Inc.	SSP-24	SolarStar	2.16	23.2	Moderately Selective Black Paint	0.682	-4.54	-0.800	24	23
SunEarth, Inc.	SSP-32	SolarStar	2.91	31.3	Moderately Selective Black Paint	0.682	-4.54	-0.800	33	31
SunEarth, Inc.	SSP-40	SolarStar	3.63	39.1	Moderately Selective Black Paint	0.682	-4.54	-0.800	41	39
Sunsaray Solar Manufacturing, Inc.	NC-32	Northern Comfort	3.18	34.2	Black Nickel	0.508	-4.84	-0.853	24	23
Synergy Solar	S19.78	Synergy	1.85	19.9	Moderately Selective Black Paint	0.626	-6.01	-1.060	17	16
Synergy Solar	S26.68	Synergy	2.48	26.7	Moderately Selective Black Paint	0.626	-6.01	-1.060	23	22
Synergy Solar	T19.78	Synergy	1.85	19.9	Sputtered aluminum nitride	0.647	-4.67	-0.822	19	18
Synergy Solar	T26.68	Synergy	2.48	26.7	Sputtered aluminum nitride	0.647	-4.67	-0.822	26	24
Synergy Solar	TC-19.78	Synergy	1.84	19.8	Sputtered aluminum nitride	0.686	-4.59	-0.809	20	19
Synergy Solar	TC-26.52	Synergy	2.48	26.7	Sputtered aluminum nitride	0.697	-4.57	-0.806	28	26
Thermo Dynamics, Ltd.	G32-P	Thermo Dynamics G Series	2.98	32.1	Moderately Selective Black Paint	0.700	-4.93	-0.870	30	29
Thermo Technologies	TMA-600-20	Mazdon	3.06	32.9	Black Chrome	0.530	-1.42	-0.250	28	26
Thermo Technologies	TMA-600-30	Mazdon	4.58	49.3	Black Chrome	0.530	-1.42	-0.250	42	40
Thermo Technologies	TMA-600-50	Mazdon	7.64	82.3	Black Chrome	0.530	-1.42	-0.250	70	66
Thermo Technologies	TMA-600-70	Mazdon	10.70	115.2	Black Chrome	0.530	-1.42	-0.250	97	92
Thermo Technologies	TMA-600-80	Mazdon	12.22	131.6	Black Chrome	0.530	-1.42	-0.250	111	105
Thermomax Industries Ltd.	AST20	Solamax	2.85	30.7	Sputtered aluminum nitride	0.574	-3.05	-0.537	24	23
Thermomax Industries Ltd.	AST30	Solamax	4.28	46.1	Sputtered aluminum nitride	0.574	-3.05	-0.537	36	34
Thermomax Industries Ltd.	AST50	Solamax	7.13	76.7	Sputtered aluminum nitride	0.574	-3.05	-0.537	60	56
Thermomax Industries Ltd.	AST70	Solamax	9.98	107.4	Sputtered aluminum nitride	0.574	-3.05	-0.537	83	79
Thermomax Industries Ltd.	AST80	Solamax	11.41	122.8	Sputtered aluminum nitride	0.574	-3.05	-0.537	95	90
TrendSetter Solar Products, Inc.	TS-30-S	Trendsetter	4.02	43.3	Aluminum Nitride	0.362	-1.83	-0.323	29	28
VELUX America Inc.	CLI M08 4000	VELUX	1.16	12.5	Selective	0.639	-3.72	-0.655	13	12

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RATINGS SUMMARY OF OG-100 CERTIFIED GLAZED COLLECTORS*

Manufacturer	Model Number	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear C (MJ/Day)	Clear C (kBtu/Day)
VELUX America Inc.	CLI S06 4000	VELUX	1.42	15.3	Selective	0.661	-3.79	-0.668	16	15
VELUX America Inc.	CLI U12 4000	VELUX	2.51	27.1	Selective	0.696	-3.90	-0.687	30	29
Viessmann Manufacturing Company (US) Inc.	100F	Vitosol	2.49	26.8	Black Chrome	0.776	-4.43	-0.780	32	30
Viessmann Manufacturing Company (US) Inc.	300T-SP3 2m2	Vitosol	2.88	31.0	Sputtered cermet	0.509	-1.09	-0.193	28	26
Viessmann Manufacturing Company (US) Inc.	300T-SP3 3m2	Vitosol	4.29	46.2	Sputtered cermet	0.509	-1.09	-0.193	42	39
Viessmann Manufacturing Company (US) Inc.	SV2,SH2	Vitosol 200F	2.52	27.2	Sputtered cermet	0.720	-3.50	-0.616	31	30
Your Solar Home, Inc.	1000G	SolarSheat	1.20	13.0	Powder coating	0.490	-6.99	-1.232	6	6
Your Solar Home, Inc.	1000GS	SolarSheat	1.58	17.0	Powder coating	0.490	-6.99	-1.232	8	8
Your Solar Home, Inc.	1500G	SolarSheat	2.05	22.1	Powder coating	0.490	-6.99	-1.232	11	10
Your Solar Home, Inc.	1500GS	SolarSheat	2.43	26.1	Powder coating	0.490	-6.99	-1.232	14	14

***OG100 Glazed Collectors Column Headings:**

Y Intercept	Intercept of the first order collector performance equation.
Slope (W/sq m-C)	Slope of the first order collector performance equation in SI units.
Slope (Btu/hr-sq ft-C)	Slope of the first order collector performance equation in IP units.
Clear C (MJ/Day)	Performance rating (SI Units) of the collector under clear conditions for rating category C.
Clear C (kBtu/Day)	Performance rating (IP Units) of the collector under clear conditions for rating category C.

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RATINGS SUMMARY OF OG-100 CERTIFIED UNGLAZED COLLECTORS*

Manufacturer	Model Number Tested	Brand Name	Gross Area (m ²)	Gross Area (ft ²)	Absorber Coating	Y Intercept	Slope (W/m ² -C)	Slope (Btu/hr-ft ² -F)	Clear A (MJ/m ² -Day)	Clear A (kBtu/ft ² -Day)
Dawn Solar Systems, Inc.	3004-CT	Dawn Solar	9.64	103.8	None	0.074	-2.78	-0.490	2	.2
Dawn Solar Systems, Inc.	3004L	Dawn Solar	9.30	100.1	Dark Green Fluorocarbon	0.126	-3.67	-0.647	2	.2
Fafco, Inc.	Hot2O		2.27	24.4	None	0.882	-18.86	-3.323	24	2.1
Fafco, Inc.	Revolution		4.41	47.4	None	0.863	-14.84	-2.616	21	1.9
Fafco, Inc.	Sungrabber		2.27	24.4	None	0.882	-18.86	-3.323	24	2.1
Fafco, Inc.	Sunsaver		3.63	39.1	None	0.838	-17.25	-3.040	21	1.9
Fafco, Inc.	Sunsaver ST		2.93	31.6	None	0.811	-22.44	-3.955	21	1.9
Heliocol USA, Inc.	HC	Heliocol	2.70	29.1	None	0.871	-21.31	-3.755	23	2.0
Performance Solar	Performance		4.44	47.8	None	0.821	-15.48	-2.727	18	1.6
Performance Solar	Performance Plus		4.41	47.4	None	0.863	-14.84	-2.616	21	1.9
Performance Solar	Performance ST		2.93	31.6	None	0.811	-22.44	-3.955	21	1.9
PVT Solar, Inc.	CL-PV-370	Cleanline-PV	34.49	371.3	None	0.236	-4.91	-0.865	6	.5
Sealed Air Corporation	FP		4.36	46.9	None	0.794	-15.94	-2.809	20	1.7
Sealed Air Corporation	FS		4.40	47.4	None	0.781	-15.22	-2.682	19	1.7
Solar Panels Plus	SPP-410	Solar Panels Plus	3.67	39.5	None	0.824	-16.73	-2.948	21	1.8
SolarTech International LLC	ST-300	SolarTech	3.23	34.8	None	0.709	-21.99	-3.875	20	1.7
Suntrek Industries, Inc.		SunTrek	3.87	41.6	None	0.860	-17.68	-3.115	20	1.7
Techno-Solis, Inc.	C20TS10	Swimmaster	3.67	39.5	None	0.824	-16.73	-2.948	21	1.8
UMA Solar	STR	SunStar	2.70	29.1	None	0.871	-21.31	-3.755	23	2.0
UMA Solar	TC	Terra Cotta	4.52	48.6	None	0.726	-15.60	-2.748	18	1.6

NOTE: ALL SIZES OF THESE COLLECTOR MODELS ARE CERTIFIED.

***OG100 Unglazed Collectors Column Headings:**

- Y Intercept Intercept of the first order collector performance equation.
- Slope (W/sq m-C) Slope of the first order collector performance equation in SI units.
- Slope (Btu/hr-sq ft-F) Slope of the first order collector performance equation in IP units.
- Clear A (MJ/sq m-Day) Performance rating (SI Units) of the collector per unit area under clear conditions for rating category A.
- Clear A (kBtu/sq ft-Day) Performance rating (IP Units) of the collector per unit area under clear conditions for rating category A.

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SYSTEMS CERTIFIED UNDER OG 300

HOW SYSTEMS ARE CERTIFIED UNDER THE OG 300 PROTOCOL

The process for rating and certifying solar water heating systems under the OG 300 protocol includes five steps for each system being rated:

1. The collectors which are part of the system must be tested and rated under the OG 100 protocol.
2. Passive systems in which the collector can not be tested separately must be rated and certified under a system testing protocol.
3. The complete specified system of collectors, tanks, pumps, motors, valves, piping, etc., is evaluated for essential elements related to:
 - system design;
 - projected durability and reliability;
 - safety;
 - operation and service procedures;
 - installation guidelines;
 - operation and maintenance manuals.
4. Data from the OG 100 collector test, the system test, and the review of design and installation guidelines are input to a computer program called *TRNSYS*. That program calculates system performance under a set of prescribed conditions.
5. Numerical results of the design and installation review (step 3) and the *TRNSYS* evaluation are integrated and entered on a certification to the supplier.

TYPES OF SOLAR WATER HEATING SYSTEMS

As you shop for solar water heating systems, you will probably see several different types. In general, all solar water heating systems fall into one of these four categories:

1. **Forced Circulation** or “active systems” are those that use a pump to circulate the water or other fluid from the collector where it is heated by the sun to the storage tank where it is kept until you need it.
2. **Integral Collector Storage (ICS)** systems, or “batch” water heaters, combine the collector and the storage tank into one. That is, the sun shines into the collector and strikes the storage tank directly, heating the water.
3. **Thermosyphon** systems have a separate storage tank, located above the collector. Liquid (which could be water or an antifreeze solution) warmed in the collector rises naturally to the storage tank where it is kept until needed.
4. **Self-Pumping** systems are those that use a phase change (liquid-vapor) or other passive means to cause the fluid in the collector to circulate and transport heat from the collector to the storage.

The ICS, thermosyphon and self-pumping systems are often called “passive” solar systems because they do not use mechanical energy to move the heated water. All four types of solar systems work well, and you should compare the performance of one type with the others.

HOW TO USE THE OG 300 SUMMARY

The thermal performance rating is based on the system design and performance projections derived from testing of the collector components used in the system, or from testing and evaluation of the system as a whole. The type of auxiliary system (e.g. gas or electric) utilized will have a large impact on the overall performance of the system. These differences arise because different types of auxiliary systems have varying standby losses and fuel conversion efficiencies. Although the auxiliary system may affect the solar system's performance, in many cases, the solar output is mostly independent of the auxiliary system used. Because gas backup systems have lower efficiencies and higher standby losses than do electric systems, it should be expected that the entire system's (including backup) performance will be lower, even if the solar output from both system types is equal.

SRCC uses the Solar Energy Factor (SEF) as its performance rating for solar domestic water heating systems. The SEF is defined as the energy delivered by the system divided by the electrical or gas energy put into the system. The SEF is presented as a number similar to the Energy Factor (EF) given to conventional water heaters by the Gas Appliance Manufacturers Association (GAMA)¹, but with the exceptions noted in the Rating Parameters Section of the directory.

$$SEF = \frac{Q_{DEL}}{Q_{AUX} + Q_{PAR}}$$

Where:

Q_{DEL} = Energy delivered to the hot water load: Using the SRCC rating conditions, this value is 43,302 kJ/day (41,045 Btu/day).

Q_{AUX} = Daily amount of energy used by the auxiliary water heater or backup element with a solar system operating, kJ/day (Btu/day). To convert to kWh, divide this value by 3,600 (3,412). To convert to therms, divide this value by 105,000 (100,000).

Q_{PAR} = Parasitic energy: Daily amounts of AC electrical energy used to power pumps, controllers, shutters, trackers, or any other item needed to operate the SDHW system, kJ/day (Btu/day). To convert to kWh, divide this value by 3,600 (3,412).

Because the hot water load assumed for calculating the SEF for all systems is the same, regardless of system size, large systems might be able to provide all of the hot water without consuming any auxiliary energy. This will cause the SEF to become very large. If one of these large systems also happens to use a control strategy that consumes no parasitic energy (ICS, thermosiphon, PV powered pump, etc.) the sum of Q_{AUX} and Q_{PAR} can be zero. This will cause the calculated value of SEF to approach infinity. In those cases, the SEF is listed in this summary as 99.9 or 999.9.

The Solar Energy Factor can be converted to an equivalent Solar Fraction (SF) as follows:

$$SF = 1 - \frac{EF}{SEF}$$
 The EF for the SRCC electric auxiliary tank is 0.9 and for the gas tank is 0.6

In this context, the Solar Fraction is the portion of the total conventional hot water heating load (delivered energy and tank standby losses) provided by solar energy. Note that an alternate definition for Solar Fraction is often used. In this alternate definition, solar fraction is the portion of the water heating load (losses are NOT included) provided by solar energy. The alternate method of calculating solar fraction will yield higher solar fractions. Therefore, use caution when comparing the solar fraction for specific systems, inputs into energy codes (such as California's Title 24), or outputs from software (such as F-Chart) to ensure that the same calculation procedure for solar fraction has been used.

¹ Gas Appliance Manufacturers Association, "Consumer's Directory of Certified Efficiency Ratings for Residential Water Heating and Water Heating Equipment", 1994, pp. 138-218

The Solar Energy Factor can be converted to an equivalent Solar Savings (Q_{SOLAR}) as follows:

$$Q_{\text{SOLAR}} = Q_{\text{DEL}} \left(\frac{1}{\text{EF}} - \frac{1}{\text{SEF}} \right) = \text{SF} * Q_{\text{CONV}}$$

Where:

- Q_{CONV} = Daily amount of energy used by the auxiliary water heater or backup element without a solar system. The SRCC standard electric auxiliary tank has an energy usage of 47,865 kJ/day (45,369 Btu/day). The SRCC standard gas auxiliary tank has an energy usage of 72,348 kJ/day (68,576 Btu/day).
- EF = The Energy Factor is the ratio of delivered energy to input energy for the reference auxiliary tank without a solar contribution. The balance of the energy is lost to the surroundings due to standby losses and conversion efficiency.
- Q_{SOLAR} = The Solar Savings is the amount of the total conventional water heating load (delivered energy and tank standby losses) provided by solar energy minus any parasitic energy use.

Note that the SEF does not directly follow the Solar Fraction. Examples of equivalent values of SEF and Solar Fraction are:

SEF	Solar Fraction with Electric Auxiliary	Solar Fraction with Gas Auxiliary
1	10%	40%
2	55%	70%
3	70%	80%
4	78%	85%
5	82%	88%
10	91%	94%
15	94%	96%

SYSTEMS CERTIFIED WITH ELECTRIC AUXILIARY

COMPARING SYSTEM COSTS FOR SYSTEMS WITH AN ELECTRIC AUXILIARY

The Energy Factor (EF) and the Solar Energy Factor (SEF) can be used to compare different water heating systems with one another and to estimate typical yearly operating costs for the specified rating conditions. Note that the performance any individual consumer will experience may differ due to location and hot water usage. The SEF includes all of the conditions specified for the DOE EF test, plus several solar specific conditions. The EF and SEF can be used to compare solar and electric system's energy use on a one-to-one basis. For electric systems, the following calculation can be used:

$$\text{Yearly Cost (\$)} = 365 \text{ days} * 12.03 \text{ kWh/EF} * \$x/\text{kWh}$$

Examples:

Assume that electricity costs \$0.12/kWh

1. TYPICAL ELECTRIC WATER HEATER (EF=0.86)

$$\text{YEARLY COST} = 365 * 12.03 / 0.86 * 0.12 = \$612.69$$

2. TYPICAL SOLAR SYSTEM (SEF=2.0)

$$\text{YEARLY COST} = 365 * 12.03 / 2.0 * 0.12 = \$263.46$$

Note that the solar system saves \$349.23 (\$612.69 - \$263.46) per year. This figure can be used as the energy cost savings basis for an economic analysis of a solar hot water system based on the assumptions for the standard DOE (EF) and SRCC OG 300 (SEF) rating conditions. Other factors such as initial cost, maintenance, inflation, interest rate, and replacement costs also need to be considered when making an economic analysis.

RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
ACR Solar International	Skyline System 3	200131C50	Direct Forced Circulation	5/24/2000	1.5	28404	315
ACR Solar International	Skyline System 3	200132C50	Direct Forced Circulation	5/24/2000	2.2	19494	318
ACR Solar International	Skyline System 3	200133C80	Direct Forced Circulation	5/24/2000	3.1	13500	314
ACR Solar International	Skyline System 3	200133C50	Direct Forced Circulation	5/24/2000	3.3	12744	314
ACR Solar International	Skyline System 3	200132C80	Direct Forced Circulation	12/15/2005	2.1	20142	318
ACR Solar International	Skyline System 3	100133C50	Direct Forced Circulation	2/6/2007	1.8	23544	315
ACR Solar International	Skyline System 3	200132C502TE	Direct Forced Circulation	12/9/2002	1.8	23868	318
ACR Solar International	Skyline System 3	200132C50T20E	Direct Forced Circulation	12/9/2002	1.8	24624	0
ACR Solar International	Skyline System 5	200152C80EX	Indirect Forced Circulation	2/15/2001	1.7	25112	0
ACR Solar International	Skyline System 5	200153C80EX	Indirect Forced Circulation	2/15/2001	2.1	20320	0
ACR Solar International	Skyline System 5	200154C80EX	Indirect Forced Circulation	2/15/2001	2.6	16565	0
ACR Solar International	Skyline System 5	200152C80EX2T E	Indirect Forced Circulation	12/9/2002	1.6	27756	0
ACR Solar International	Skyline System 5	200153C80EX2T E	Indirect Forced Circulation	12/9/2002	1.9	23166	0
Alternate Energy Technologies	EagleSun	DB-80-40	Indirect Forced Circulation	8/22/2006	1.7	20410	5357
Alternate Energy Technologies	EagleSun	DB-80-52	Indirect Forced Circulation	8/22/2006	2.0	16165	5338
Alternate Energy Technologies	EagleSun	DB-80-64	Indirect Forced Circulation	8/22/2006	2.5	11821	5338
Alternate Energy Technologies	EagleSun	DB-80-80	Indirect Forced Circulation	8/22/2006	3.7	6870	4781
Alternate Energy Technologies	EagleSun	DB-120-64	Indirect Forced Circulation	8/22/2006	2.1	15114	5338
Alternate Energy Technologies	EagleSun	DB-120-80	Indirect Forced Circulation	8/22/2006	2.7	11104	4781
Alternate Energy Technologies	EagleSun	DB-120-96	Indirect Forced Circulation	8/22/2006	4.0	5974	4781
Alternate Energy Technologies	EagleSun DX	DX-80-40	Indirect Forced Circulation	8/22/2006	1.9	17550	5242
Alternate Energy Technologies	EagleSun DX	DX-80-52	Indirect Forced Circulation	8/22/2006	2.3	13500	5222
Alternate Energy Technologies	EagleSun DX	DX-80-64	Indirect Forced Circulation	8/22/2006	3.6	7290	4742
Alternate Energy Technologies	EagleSun DX	DX-80-80	Indirect Forced Circulation	8/22/2006	6.4	1998	4762
Alternate Energy Technologies	EagleSun DX	DX-120-64	Indirect Forced Circulation	8/22/2006	2.8	10260	5203
Alternate Energy Technologies	EagleSun DX	DX-120-80	Indirect Forced Circulation	8/22/2006	4.5	4860	4742
Alternate Energy Technologies	EagleSun DX	DX-120-96	Indirect Forced Circulation	8/22/2006	9.1	0	4762
Bobcat & Sun, Inc.	Sun-Pak	SP32PHE-1	Indirect Forced Circulation	8/9/2007	1.5	22234	6078
Bobcat & Sun, Inc.	Sun-Pak	SP64PHE-1	Indirect Forced Circulation	8/9/2007	2.3	12756	6011
Bobcat & Sun, Inc.	Sun-Pak	SP40PHE-1	Indirect Forced Circulation	8/9/2007	1.6	20617	6056
Bobcat & Sun, Inc.	Sun-Pak	SP80PHE-1	Indirect Forced Circulation	8/9/2007	3.2	8141	5501
Bobcat & Sun, Inc.	Sun-Pak	SP32CHE-1	Indirect Forced Circulation	9/8/1994	1.5	22240	6078

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Bobcat & Sun, Inc.	Sun-Pak	SP64CHE-1	Indirect Forced Circulation	9/8/1994	2.7	10084	6034
Bobcat & Sun, Inc.	Sun-Pak	SP40CHE-1	Indirect Forced Circulation	9/8/1994	1.8	18626	6056
Bobcat & Sun, Inc.	Sun-Pak	SP80CHE-1	Indirect Forced Circulation	9/8/1994	4.2	4703	5501
Bobcat & Sun, Inc.	Sun-Pak	SP32PHE	Indirect Forced Circulation	8/9/2007	1.3	27162	6078
Bobcat & Sun, Inc.	Sun-Pak	SP64PHE	Indirect Forced Circulation	8/9/2007	1.9	17010	6078
Bobcat & Sun, Inc.	Sun-Pak	SP40PHE	Indirect Forced Circulation	8/9/2007	1.4	24408	6078
Bobcat & Sun, Inc.	Sun-Pak	SP80PHE	Indirect Forced Circulation	8/9/2007	2.3	13338	5501
Bobcat & Sun, Inc.	Sun-Pak	SP32CHE	Indirect Forced Circulation	9/8/1994	1.4	25920	6078
Bobcat & Sun, Inc.	Sun-Pak	SP64CHE	Indirect Forced Circulation	9/8/1994	2.1	14688	6078
Bobcat & Sun, Inc.	Sun-Pak	SP40CHE	Indirect Forced Circulation	9/8/1994	1.5	22680	6078
Bobcat & Sun, Inc.	Sun-Pak	SP80CHE	Indirect Forced Circulation	9/8/1994	2.7	10530	5501
BTF, Ltd.	Solar Patriot TM	SP20-1-65G-PV-E	Indirect Forced Circulation	3/1/2007	1.2	37260	0
BTF, Ltd.	Solar Patriot TM	SP20-2-80G-PV-E	Indirect Forced Circulation	3/1/2007	1.4	31590	0
Butler Sun Solutions	Solar Butler	BSS-S1-40Ea	Indirect Forced Circulation	7/1/2004	1.3	32215	1004
Butler Sun Solutions	Solar Butler	BSS-S1-40Eb	Indirect Forced Circulation	7/1/2004	1.2	36410	977
Butler Sun Solutions	Solar Butler	BSS-S1-50Ea	Indirect Forced Circulation	7/1/2004	1.4	30008	1004
Butler Sun Solutions	Solar Butler	BSS-S1-80Ea	Indirect Forced Circulation	7/1/2004	1.6	25219	1034
Butler Sun Solutions	Solar Butler	BSS-S1-80Ec	Indirect Forced Circulation	7/1/2004	1.4	30044	1002
Butler Sun Solutions	Solar Butler	BSS-S1-50Ec	Indirect Forced Circulation	7/1/2004	1.3	31236	1004
Butler Sun Solutions	Solar Butler	BSS-S1-40Ec	Indirect Forced Circulation	8/29/2005	1.4	30640	1004
Butler Sun Solutions	Solar Butler	BSS-PV1-40Ea	Indirect Forced Circulation	9/15/2005	1.6	26418	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Eb	Indirect Forced Circulation	9/15/2005	1.2	36802	0
Butler Sun Solutions	Solar Butler	BSS-PV1-50Ea	Indirect Forced Circulation	9/15/2005	1.4	30611	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80Ea	Indirect Forced Circulation	9/15/2005	1.7	26179	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80Ec	Indirect Forced Circulation	9/15/2005	1.4	30778	0
Butler Sun Solutions	Solar Butler	BSS-PV1-50Ec	Indirect Forced Circulation	9/15/2005	1.4	31828	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Ec	Indirect Forced Circulation	9/15/2005	1.4	31241	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Ed	Indirect Forced Circulation	2/11/2008	1.4	30014	0
Butler Sun Solutions	Solar Butler	BSS-S1-80E2a	Indirect Forced Circulation	9/15/2005	1.4	28675	1242
Butler Sun Solutions	Solar Butler	BSS-S1-80E2b	Indirect Forced Circulation	9/15/2005	1.7	24796	1242
Butler Sun Solutions	Solar Butler	BSS-PV1-80E2a	Indirect Forced Circulation	9/15/2005	1.5	29734	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80E2b	Indirect Forced Circulation	9/15/2005	1.7	26008	0

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Davis Energy Group	SunCache	SCU-50-ES	Indirect Integral Collector Storage	6/2/2008	1.1	40932	0
Davis Energy Group	SunCache	SCG-50-ES	Indirect Integral Collector Storage	6/2/2008	1.1	38610	0
Davis Energy Group	SunCache	SCG-100-ES	Indirect Integral Collector Storage	6/2/2008	1.2	35478	0
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-32	Indirect Forced Circulation	11/17/2006	1.5	24097	4943
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-40	Indirect Forced Circulation	11/17/2006	1.7	20973	4943
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-42	Indirect Forced Circulation	11/17/2006	1.8	18960	4925
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-63	Indirect Forced Circulation	11/17/2006	2.6	12231	4457
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-64	Indirect Forced Circulation	11/17/2006	2.4	13434	4457
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-8009-80	Indirect Forced Circulation	11/17/2006	3.2	9256	4457
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009-40	Indirect Forced Circulation	11/17/2006	1.6	21492	4943
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009-64	Indirect Forced Circulation	11/17/2006	2.3	14094	4961
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009-80	Indirect Forced Circulation	11/17/2006	2.8	10422	5015
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009-96	Indirect Forced Circulation	11/17/2006	3.7	7182	4493
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009120	Indirect Forced Circulation	11/17/2006	6.2	2538	4493
Energy Laboratories, Inc.	Duro-Drainback Solar Water Heating System	D2B-12009-128	Indirect Forced Circulation	11/17/2006	7.5	1296	4493
Energy Laboratories, Inc.	Roof Integrated Thermosiphon System	RITH 72 E	Direct Thermosiphon	8/18/2006	1.8	24300	0
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA1-E80-1T	Indirect Forced Circulation	9/29/2008	1.8	22680	946
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA2-E80-1T	Indirect Forced Circulation	9/29/2008	3.7	10800	921
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA2-E120-1T	Indirect Forced Circulation	9/29/2008	3.4	11880	924
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA3-E120-1T	Indirect Forced Circulation	9/29/2008	7.1	5130	926
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA4-E120-1T	Indirect Forced Circulation	9/29/2008	47.0	0	921
Enerworks, Inc.	Single Tank Solar Water Heating Appliance	EWRA1-E120-1T	Indirect Forced Circulation	9/29/2008	1.8	23544	971
Enerworks, Inc.	Solar Water Heating Appliance	EWRA1-E40	Indirect Forced Circulation	2/9/2007	1.6	26082	1001

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Enerworks, Inc.	Solar Water Heating Appliance	EWRA1-E40	Indirect Forced Circulation	2/9/2007	1.6	26082	1001
Enerworks, Inc.	Solar Water Heating Appliance	EWRA1-E80	Indirect Forced Circulation	2/9/2007	1.6	26190	1108
Enerworks, Inc.	Solar Water Heating Appliance	EWRA2-E80	Indirect Forced Circulation	2/9/2007	2.4	17280	929
Enerworks, Inc.	Solar Water Heating Appliance	EWRA2-E100	Indirect Forced Circulation	2/9/2007	2.2	18900	932
Enerworks, Inc.	Solar Water Heating Appliance	EWRA3-E100	Indirect Forced Circulation	2/9/2007	2.6	13662	3143
Enerworks, Inc.	Solar Water Heating Appliance	EWRA3-E120	Indirect Forced Circulation	2/9/2007	2.5	13932	3164
Enerworks, Inc.	Solar Water Heating Appliance	EWRA4-E120	Indirect Forced Circulation	2/9/2007	3.4	9720	3132
Enerworks, Inc.	Solar Water Heating Appliance	EWRA4-E144	Indirect Forced Circulation	2/9/2007	2.9	11718	3143
Fafco, Inc.	Polymer Drainback	VDB-48U-50E	Indirect Forced Circulation	4/3/2007	1.6	24732	3183
Fafco, Inc.	Polymer Drainback	VDB-48U-80E	Indirect Forced Circulation	4/3/2007	1.8	21060	2874
Fafco, Inc.	Polymer Drainback	VDB-48UX2-50E	Indirect Forced Circulation	4/3/2007	1.8	21222	2834
Fafco, Inc.	Polymer Drainback	VDB-48UX2-80E	Indirect Forced Circulation	4/3/2007	1.8	21168	2928
Fafco, Inc.	Polymer Drainback	VDB-48U-50E-50S	Indirect Forced Circulation	4/3/2007	1.3	29538	3183
Fafco, Inc.	Polymer Drainback	VDB-48U-50E-80S	Indirect Forced Circulation	4/3/2007	1.3	29646	3183
Fafco, Inc.	Polymer Drainback	VDB-48UX2-50E-50S	Indirect Forced Circulation	4/3/2007	1.5	26460	2874
Fafco, Inc.	Polymer Drainback	VDB-48UX2-50E-80S	Indirect Forced Circulation	4/3/2007	1.5	26460	2955
Heat Transfer Products	SuperStor Conntender Solar	SSC-119SE	Indirect Forced Circulation	2/14/2008	2.4	14958	2736
Heat Transfer Products	SuperStor Contender Solar	SSC-50SE	Indirect Forced Circulation	2/14/2008	1.7	22680	3056
Heat Transfer Products	SuperStor Contender Solar	SSC-80SE	Indirect Forced Circulation	2/14/2008	1.8	21060	3056
Heat Transfer Products	SuperStor Ultra Solar	SSU-60SE	Indirect Forced Circulation	2/14/2008	1.6	24084	3046
Heat Transfer Products	SuperStor Ultra Solar	SSU-80SE	Indirect Forced Circulation	2/14/2008	1.8	20790	3056
Heat Transfer Products	SuperStor Ultra Solar	SSU-119SE	Indirect Forced Circulation	2/14/2008	2.3	16254	2736
Heat Transfer Products	SuperStor Ultra Solar	SSU80SE-DW	Indirect Forced Circulation	2/14/2008	1.8	21384	3035
Heat Transfer Products	SuperStor Ultra Solar	SSU119SE-DW	Indirect Forced Circulation	2/14/2008	2.3	15768	2736
Heliodyne, Inc.	Helio-Flo	HF 1408 G 80 AC S E	Direct Forced Circulation	10/25/2004	2.1	19602	1145
Heliodyne, Inc.	Helio-Flo	HF 1410 G 80 AC S E	Direct Forced Circulation	10/25/2004	2.9	14040	1145
Heliodyne, Inc.	Helio-Flo	HF 1410 G 120 AC S E	Direct Forced Circulation	10/25/2004	2.6	15498	1145
Heliodyne, Inc.	Helio-Flo	HF 23366 G 80 AC S E	Direct Forced Circulation	10/25/2004	5.0	7560	1145
Heliodyne, Inc.	Helio-Flo	HF 2408 G 80 AC S E	Direct Forced Circulation	10/25/2004	9.0	3780	1037
Heliodyne, Inc.	Helio-Flo	HF 2408 G 120 AC S E	Direct Forced Circulation	10/25/2004	7.9	4320	1145
Heliodyne, Inc.	Helio-Flo	HF 2410 G 120 AC S E	Direct Forced Circulation	10/25/2004	41.8	0	1037
Heliodyne, Inc.	Helio-Flo	HF 3408 G 120 AC S E	Direct Forced Circulation	10/25/2004	18.7	0	2315

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Heliodyne, Inc.	Helio-Flo	HF 3410 G 160 AC S E	Direct Forced Circulation	10/25/2004	18.7	0	2315
Heliodyne, Inc.	Helio-Flo	HF 1410 G 80 AC D E	Direct Forced Circulation	10/25/2004	2.1	19062	1145
Heliodyne, Inc.	Helio-Flo	HF 23366 G 80 AC D E	Direct Forced Circulation	10/25/2004	3.0	13176	1145
Heliodyne, Inc.	Helio-Flo	HF 2408 G 80 AC D E	Direct Forced Circulation	10/25/2004	4.0	9720	1037
Heliodyne, Inc.	Helio-Flo	HF 2408 G 120 AC D E	Direct Forced Circulation	10/25/2004	3.8	10314	1130
Heliodyne, Inc.	Helio-Flo	HF 2410 G 120 AC D E	Direct Forced Circulation	10/25/2004	7.7	4590	1037
Heliodyne, Inc.	Helio-Flo	HF 3408 G 120 AC D E	Direct Forced Circulation	10/25/2004	10.2	1620	2621
Heliodyne, Inc.	Helio-Flo	HF 3410 G 120 AC D E	Direct Forced Circulation	10/25/2004	18.9	0	2294
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 ACS	Indirect Forced Circulation	10/1/1992	1.8	19332	4133
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 ACS	Indirect Forced Circulation	10/1/1992	2.2	15390	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 408 G 120 ACS	Indirect Forced Circulation	10/1/1992	3.9	6750	4331
Heliodyne, Inc.	Heliopak	DWCL HE HP 1 408 G 80 ACS	Indirect Forced Circulation	10/1/1992	1.8	22497	2045
Heliodyne, Inc.	Heliopak	DWCL HE HP 1 410 G 80 ACS	Indirect Forced Circulation	10/1/1992	2.1	18688	2045
Heliodyne, Inc.	Heliopak	DWCL HE HP 1 3366 G 80 ACS	Indirect Forced Circulation	7/9/2001	1.6	25187	2045
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 3366 G 50 ACS	Indirect Forced Circulation	7/9/2001	1.7	21762	4172
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 3366 G 80 ACS	Indirect Forced Circulation	7/9/2001	1.6	22140	4167
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 3366 G 80 ACS	Indirect Forced Circulation	7/9/2001	3.2	9612	3758
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 3366 G 120 ACS	Indirect Forced Circulation	7/9/2001	2.9	11016	3878
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 80 ACS	Indirect Forced Circulation	7/9/2001	1.8	19332	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 410 G 120 ACS	Indirect Forced Circulation	7/9/2001	9.5	810	3758
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 65 ACD	Indirect Forced Circulation	10/1/1992	1.8	19764	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 408 G 80 ACD	Indirect Forced Circulation	10/1/1992	2.8	11016	4331
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 408 G 120 ACD	Indirect Forced Circulation	10/1/1992	2.7	11988	4331
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 410 G 120 ACD	Indirect Forced Circulation	10/1/1992	3.8	7020	4331
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 ACD	Indirect Forced Circulation	4/16/1998	1.6	23436	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 3366 G 80 ACD	Indirect Forced Circulation	7/9/2001	1.4	26244	4178
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 3366 G 80 ACD	Indirect Forced Circulation	7/9/2001	2.3	14958	3764
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 80 ACD	Indirect Forced Circulation	7/9/2001	1.6	23760	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 ACD	Indirect Forced Circulation	7/9/2001	1.8	20088	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 PVS	Indirect Forced Circulation	12/10/1996	2.3	18468	0
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 PVS	Indirect Forced Circulation	7/15/1998	2.0	21600	0
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 PVD	Indirect Forced Circulation	12/10/1996	1.9	22842	0

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 PVD	Indirect Forced Circulation	7/15/1998	1.7	26136	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 3366 G PV 50 EE S	Indirect Forced Circulation	4/28/2006	1.6	26460	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 3366 G PV 50 EE S	Indirect Forced Circulation	4/28/2006	1.6	26460	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 3366 G PV 65 EE S	Indirect Forced Circulation	4/28/2006	1.6	27108	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 408 G PV 50 EE S	Indirect Forced Circulation	4/28/2006	1.8	24192	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 408 G PV 65 EE S	Indirect Forced Circulation	4/28/2006	1.8	24624	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 408 G PV 80 EE S	Indirect Forced Circulation	4/28/2006	1.7	24840	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 410 G PV 65 EE S	Indirect Forced Circulation	4/28/2006	2.1	20628	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 410 G PV 80 EE S	Indirect Forced Circulation	4/28/2006	2.1	20952	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 3366 G PV 80 EE S	Indirect Forced Circulation	4/28/2006	2.9	15066	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 408 G PV 120 SE S	Indirect Forced Circulation	4/28/2006	3.2	13608	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 410 G PV 120 SE S	Indirect Forced Circulation	4/28/2006	5.7	7560	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 3 3366 G PV 120 SE S	Indirect Forced Circulation	4/28/2006	5.7	7560	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 3 408 G PV 120 SE S	Indirect Forced Circulation	4/28/2006	11.5	3780	0
Heliodyne, Inc.	HP HELIX AC	HP 1 408 GAC WAC 50 S	Indirect Forced Circulation	2/18/2000	1.9	19872	2663
Heliodyne, Inc.	HP HELIX AC	HP 1 410 GAC WAC 80 S	Indirect Forced Circulation	2/9/2000	2.2	17280	2663
Integrated Solar, LLC	CopperSun	CS440-E	Direct Integral Collector Storage	4/29/1998	1.4	30024	0
Integrated Solar, LLC	CopperSun	CS330-E	Direct Integral Collector Storage	4/24/2000	1.3	32940	0
Integrated Solar, LLC	CopperSun	CS340-E	Direct Integral Collector Storage	4/24/2000	1.3	32940	0
Integrated Solar, LLC	CopperSun	CS450-E	Direct Integral Collector Storage	4/24/2000	1.4	30402	0
Integrated Solar, LLC	CopperSun	CS330SV-E	Direct Integral Collector Storage	5/22/2003	1.3	34128	0
Integrated Solar, LLC	CopperSun	CS340SV-E	Direct Integral Collector Storage	5/22/2003	1.3	34560	0
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-65-D- 40P	Indirect Forced Circulation	12/9/1994	1.4	24300	5808
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80-D- 64P	Indirect Forced Circulation	12/9/1994	1.8	18360	5808
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-12-120- D-80P	Indirect Forced Circulation	12/28/1994	2.0	16632	5417
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-65S- 40P	Indirect Forced Circulation	12/28/1994	1.7	19494	5808
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80S- 64P	Indirect Forced Circulation	12/28/1994	2.2	13662	5785
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-120S- 80P	Indirect Forced Circulation	12/28/1994	2.5	12150	5271
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80S- 40P	Indirect Forced Circulation	8/1/2005	1.7	20196	5785
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80S- 40C	Indirect Forced Circulation	8/1/2005	1.9	15822	6453
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80S- 48C	Indirect Forced Circulation	1/5/2009	2.3	12528	6372
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80S- 48P	Indirect Forced Circulation	1/5/2009	1.8	17820	5761System Supplier

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Morley Manufacturing	High Sierra Drainback	HS60B/40	Indirect Forced Circulation	12/9/1994	1.7	22680	2650
Mr. Sun Solar	Sol-Reliant	SR 56/80 E PVDB	Indirect Forced Circulation	12/9/2004	2.8	15390	0
Mr. Sun Solar	Sol-Reliant	SR 40/80 E PVDB	Indirect Forced Circulation	10/5/2006	2.0	21438	0
Mr. Sun Solar	Sol-Reliant	SR 56/120 SE PVDB	Indirect Forced Circulation	12/3/2007	3.0	14277	0
Mr. Sun Solar	Sol-Reliant	SR80/80 E PVDB	Indirect Forced Circulation	1/30/2008	4.2	10260	0
Mr. Sun Solar	Sol-Reliant	SR112/80 E PVDB	Indirect Forced Circulation	1/30/2008	17.8	2430	0
Mr. Sun Solar	Sol-Reliant	SR112/120 E PVDB	Indirect Forced Circulation	1/30/2008	8.9	4860	0
Pacific West Solar	Freeze Safe SWH	FS410-80-1	Direct Forced Circulation	3/26/2008	2.0	19602	1901
Power Partners, Inc.	System 3	200131C50	Direct Forced Circulation	6/6/2008	1.5	28404	315
Power Partners, Inc.	System 3	200132C50	Direct Forced Circulation	6/6/2008	2.2	19494	318
Power Partners, Inc.	System 3	200133C80	Direct Forced Circulation	6/6/2008	3.1	13500	314
Power Partners, Inc.	System 3	200133C50	Direct Forced Circulation	6/6/2008	3.3	12744	314
Power Partners, Inc.	System 3	200132C80	Direct Forced Circulation	6/6/2008	2.1	20142	318
Power Partners, Inc.	System 3	100133C50	Direct Forced Circulation	6/6/2008	1.8	23544	315
Power Partners, Inc.	System 3	200132C502TE	Direct Forced Circulation	6/6/2008	1.8	23868	318
Power Partners, Inc.	System 3	200132C50T20E	Direct Forced Circulation	6/6/2008	1.8	24624	0
Power Partners, Inc.	System 5	200152C80EX	Indirect Forced Circulation	6/6/2008	1.7	25112	0
Power Partners, Inc.	System 5	200153C80EX	Indirect Forced Circulation	6/6/2008	2.1	20320	0
Power Partners, Inc.	System 5	200154C80EX	Indirect Forced Circulation	6/6/2008	2.6	16565	0
Power Partners, Inc.	System 5	200152C80EX2T E	Indirect Forced Circulation	6/6/2008	1.6	27756	0
Power Partners, Inc.	System 5	200153C80EX2T E	Indirect Forced Circulation	6/6/2008	1.9	23166	0
Rheem Water Heaters	Rheem Solaraide	RS47-21BP	Indirect Thermosyphon	1/30/2008	1.3	32290	0
Rheem Water Heaters	Rheem Solaraide	RS80-42BP	Indirect Thermosyphon	1/30/2008	1.5	28607	0
Schuco USA L.P.	Premium Package	Premium II-80E	Indirect Forced Circulation	4/16/2007	2.8	12820	2755
Schuco USA L.P.	Premium Package	Premium III-120E	Indirect Forced Circulation	4/16/2007	3.6	9233	2755
Schuco USA L.P.	Premium Package	Premium II-120E	Indirect Forced Circulation	9/1/2008	2.3	16343	2755
Schuco USA L.P.	Slimline Package	Slimline II-80E	Indirect Forced Circulation	4/16/2007	2.4	15216	2765
Schuco USA L.P.	Slimline Package	Slimline III-120E	Indirect Forced Circulation	4/16/2007	3.1	11341	2755
Schuco USA L.P.	Slimline Package	Slimline II-120E	Indirect Forced Circulation	9/1/2008	2.0	18661	2755
Solahart Industries	SOLAHART	181L	Direct Thermosyphon	3/28/2003	1.4	30471	0
Solahart Industries	SOLAHART	302L	Direct Thermosyphon	3/28/2003	1.7	26038	0
Solahart Industries	SOLAHART	303L	Direct Thermosyphon	3/28/2003	2.2	19880	0

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Solahart Industries	SOLAHART	443L	Direct Thermosyphon	3/28/2003	1.9	23200	0
Solahart Industries	SOLAHART	444L	Direct Thermosyphon	3/28/2003	2.3	18601	0
Solahart Industries	SOLAHART	181J & 181J Free Heat	Indirect Thermosyphon	3/28/2003	1.3	32290	0
Solahart Industries	SOLAHART	182J & 182J Free Heat	Indirect Thermosyphon	3/28/2003	1.7	24911	0
Solahart Industries	SOLAHART	302J & 302J Free Heat	Indirect Thermosyphon	3/28/2003	1.5	28614	0
Solahart Industries	SOLAHART	302JXII	Indirect Thermosyphon	3/28/2003	1.5	28614	0
Solahart Industries	SOLAHART	303J & 303J Free Heat	Indirect Thermosyphon	3/28/2003	1.8	23763	0
Solahart Industries	SOLAHART	303JXII	Indirect Thermosyphon	3/28/2003	1.8	23763	0
Solahart Industries	SOLAHART	443J & 443J Free Heat	Indirect Thermosyphon	3/28/2003	1.6	26883	0
Solahart Industries	SOLAHART	443JXII	Indirect Thermosyphon	3/28/2003	1.6	26883	0
Solahart Industries	SOLAHART	444J & 444J Free Heat	Indirect Thermosyphon	3/28/2003	1.9	22942	0
Solahart Industries	SOLAHART	444JXII	Indirect Thermosyphon	3/28/2003	1.9	22942	0
Solahart Industries	SOLAHART	181KF & 181KF Free Heat	Indirect Thermosyphon	3/28/2003	1.4	31292	0
Solahart Industries	SOLAHART	181BCXII	Indirect Thermosyphon	3/28/2003	1.3	32194	0
Solahart Industries	SOLAHART	182KF & 182KF Free Heat	Indirect Thermosyphon	3/28/2003	2.0	21954	0
Solahart Industries	SOLAHART	182BCXII	Indirect Thermosyphon	3/28/2003	1.9	22980	0
Solahart Industries	SOLAHART	302KF & 302KF Free Heat	Indirect Thermosyphon	3/28/2003	1.6	26269	0
Solahart Industries	SOLAHART	302BCXII	Indirect Thermosyphon	3/28/2003	1.6	26269	0
Solahart Industries	SOLAHART	303KF & 303KF Free Heat	Indirect Thermosyphon	3/28/2003	2.3	18827	0
Solahart Industries	SOLAHART	303BCXII	Indirect Thermosyphon	3/28/2003	2.3	18827	0
Solahart Industries	SOLAHART	443KF & 443KF Free Heat	Indirect Thermosyphon	3/28/2003	2.0	21421	0
Solahart Industries	SOLAHART	443BCXII	Indirect Thermosyphon	3/28/2003	2.0	21421	0
Solahart Industries	SOLAHART	444KF & 444KF Free Heat	Indirect Thermosyphon	3/28/2003	2.9	14728	0
Solahart Industries	SOLAHART	444BCXII	Indirect Thermosyphon	3/28/2003	2.9	14728	0
Solahart Industries	SOLAHART	ASE 181L	Direct Thermosyphon	3/28/2003	1.3	32400	0
Solahart Industries	SOLAHART	ASE 302L	Direct Thermosyphon	3/28/2003	1.7	25650	0
Solahart Industries	SOLAHART	ASE 303L	Direct Thermosyphon	3/28/2003	2.0	21168	0
Solahart Industries	SOLAHART	ASE 443L	Direct Thermosyphon	3/28/2003	2.0	21870	0
Solahart Industries	SOLAHART	ASE 444L	Direct Thermosyphon	3/28/2003	2.3	18900	0
Solahart Industries	SOLAHART	ASE 181J & ASE 181J Free Heat	Indirect Thermosyphon	3/28/2003	1.3	32346	0
Solahart Industries	SOLAHART	ASE 182J & ASE 182J Free Heat	Indirect Thermosyphon	3/28/2003	1.7	26028	0
Solahart Industries	SOLAHART	ASE 302J & ASE 302J Free Heat	Indirect Thermosyphon	3/28/2003	1.7	26190	0

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Solahart Industries	SOLAHART	ASE 302JXII	Indirect Thermosyphon	3/28/2003	1.7	26190	0
Solahart Industries	SOLAHART	ASE 303J & ASE 303J Free Heat	Indirect Thermosyphon	3/28/2003	1.9	22680	0
Solahart Industries	SOLAHART	ASE 303JXII	Indirect Thermosyphon	3/28/2003	1.9	22680	0
Solahart Industries	SOLAHART	ASE 443J & ASE 443J Free Heat	Indirect Thermosyphon	3/28/2003	1.9	22950	0
Solahart Industries	SOLAHART	ASE 443JXII	Indirect Thermosyphon	3/28/2003	1.9	22950	0
Solahart Industries	SOLAHART	ASE 444J & ASE 444J Free Heat	Indirect Thermosyphon	3/28/2003	2.1	20682	0
Solahart Industries	SOLAHART	ASE 444JXII	Indirect Thermosyphon	3/28/2003	2.1	20682	0
Solahart Industries	SOLAHART	ASE 181KF & ASE 181KF Free Heat	Indirect Thermosyphon	3/28/2003	1.4	31050	0
Solahart Industries	SOLAHART	ASE 181BCXII	Indirect Thermosyphon	3/28/2003	1.4	31050	0
Solahart Industries	SOLAHART	ASE 182KF & ASE 182KF Free Heat	Indirect Thermosyphon	3/28/2003	1.9	23112	0
Solahart Industries	SOLAHART	ASE 182BCXII	Indirect Thermosyphon	3/28/2003	1.9	23112	0
Solahart Industries	SOLAHART	ASE 302KF & ASE 302KF Free Heat	Indirect Thermosyphon	3/28/2003	1.9	23328	0
Solahart Industries	SOLAHART	ASE 302BCXII	Indirect Thermosyphon	3/28/2003	1.9	23328	0
Solahart Industries	SOLAHART	ASE 303KF & ASE 303KF Free Heat	Indirect Thermosyphon	3/28/2003	2.4	18144	0
Solahart Industries	SOLAHART	ASE 303BCXII	Indirect Thermosyphon	3/28/2003	2.4	18144	0
Solahart Industries	SOLAHART	ASE 443KF & ASE 443KF Free Heat	Indirect Thermosyphon	3/28/2003	2.3	18522	0
Solahart Industries	SOLAHART	ASE 443BCXII	Indirect Thermosyphon	3/28/2003	2.3	18522	0
Solahart Industries	SOLAHART	ASE 444KF & ASE 444KF Free Heat	Indirect Thermosyphon	3/28/2003	2.9	14904	0
Solahart Industries	SOLAHART	ASE 444BCXII	Indirect Thermosyphon	3/28/2003	2.9	14904	0
Solahart Industries	Streamline Electric	270SL-2Bt	Direct Forced Circulation	4/21/2005	2.6	14980	1760
Solahart Industries	Streamline Electric	270SL-2L	Direct Forced Circulation	4/21/2005	1.8	22182	1584
Solahart Industries	Streamline Electric	270SL-3Bt	Direct Forced Circulation	4/21/2005	6.1	5474	1584
Solahart Industries	Streamline Electric	270SL-3L	Direct Forced Circulation	4/21/2005	2.4	16421	1584
Solahart Industries	Streamline Electric	340SL-2Bt	Direct Forced Circulation	4/21/2005	2.5	15898	1760
Solahart Industries	Streamline Electric	340SL-2L	Direct Forced Circulation	4/21/2005	1.8	23041	1584
Solahart Industries	Streamline Electric	340SL-3Bt	Direct Forced Circulation	4/21/2005	5.3	6624	1584
Solahart Industries	Streamline Electric	340SL-3L	Direct Forced Circulation	4/21/2005	2.3	17280	1584
Solahart Industries	Streamline Electric	430SL-2Bt	Direct Forced Circulation	4/21/2005	2.4	16301	1760
Solahart Industries	Streamline Electric	430SL-2L	Direct Forced Circulation	4/21/2005	1.7	23559	1584

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Solahart Industries	Streamline Electric	430SL-3Bt	Direct Forced Circulation	4/21/2005	5.1	6912	1584
Solahart Industries	Streamline Electric	430SL-3L	Direct Forced Circulation	4/21/2005	2.2	17856	1584
Solarhot	Solvevox DB	S-SV-DB100	Indirect Forced Circulation	6/28/2007	5.9	2160	5223
Solarhot	Solvevox DB	S-SV-DB100P64	Indirect Forced Circulation	3/17/2008	3.9	5832	5192
Solarhot	Solvevox DB	S-SV-DB100P32	Indirect Forced Circulation	3/17/2008	1.7	20142	5234
Solarhot	Solvevox DB	S-SV-DBET30	Indirect Forced Circulation	6/6/2008	1.7	19116	5927
Solarhot	Solvevox DB	S-SV-DBET60	Indirect Forced Circulation	6/6/2008	7.4	0	5885
Solarhot	Solvevox DB	S-SV-DBET30-120	Indirect Forced Circulation	6/19/2008	1.7	19818	5906
Solarhot	Solvevox DB	S-SV-DBET60-120	Indirect Forced Circulation	6/19/2008	7.4	0	5885
Solarhot	Solvevox Glycol	S-SV-G100	Indirect Forced Circulation	1/11/2008	5.5	2646	5234
Solarhot	Solvevox Glycol	S-SV-G100ET	Indirect Forced Circulation	1/11/2008	7.4	0	5885
Solarhot	Solvevox Glycol	S-SV-GET30	Indirect Forced Circulation	3/17/2008	1.8	18360	5885
Solarhot	Solvevox Glycol	S-SV-GC100P64	Indirect Forced Circulation	3/17/2008	4.6	4266	5213
Solarhot	Solvevox Glycol	S-SV-GET60-120	Indirect Forced Circulation	3/17/2008	7.4	0	5885
Solarhot	Solvevox Glycol	S-SV-GET30-120	Indirect Forced Circulation	3/17/2008	1.7	18900	5885
Solarhot	Solvevox Glycol	S-SV-GASWS52B80	Indirect Forced Circulation	8/12/2008	1.5	23760	5906
Solarhot	Solvevox Glycol	S-SV-G2ASW52B120	Indirect Forced Circulation	8/12/2008	2.7	10314	5885
Solene	Solene/Chromagen DC Closed Loop	SLCR32DC-80HE	Indirect Forced Circulation	3/17/2006	1.7	22248	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR40DC-80HE	Indirect Forced Circulation	3/17/2006	2.0	18462	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-80HE	Indirect Forced Circulation	3/17/2006	3.3	10101	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-80HE	Indirect Forced Circulation	3/17/2006	5.5	5309	2621
Solene	Solene/Chromagen DC Closed Loop	SLCR60DC-80HE	Indirect Forced Circulation	3/17/2006	3.1	11077	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-120HE	Indirect Forced Circulation	11/7/2008	2.6	13447	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-120HE	Indirect Forced Circulation	11/7/2008	3.5	9757	2621
Solene	Solene/Chromagen DC Closed Loop	SLCR32DC-80HE-XE	Indirect Forced Circulation	12/7/2006	1.5	25920	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR40DC-80HE-XE	Indirect Forced Circulation	12/7/2006	1.7	22572	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-80HE-XE	Indirect Forced Circulation	12/7/2006	2.5	14688	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-80HE-XE	Indirect Forced Circulation	12/7/2006	3.2	11124	2621
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-120HE-XE	Indirect Forced Circulation	11/7/2008	2.1	17280	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-120HE-XE	Indirect Forced Circulation	11/7/2008	2.6	13770	2927
Solene	Solene/Chromagen DC Open Loop	SLCR32DC-66	Direct Forced Circulation	1/9/2006	2.1	18468	2117
Solene	Solene/Chromagen DC Open Loop	SLCR40DC-80	Direct Forced Circulation	1/9/2006	2.6	14850	2117

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Solene	Solene/Chromagen DC Open Loop	SLCR60DC-80	Direct Forced Circulation	1/9/2006	5.5	5940	1901
Solene	Solene/Chromagen DC Open Loop	SLCR64DC-120	Direct Forced Circulation	1/9/2006	6.9	4320	1987
Solene	Solene/Chromagen DC Open Loop	SLCR80DC-120	Direct Forced Circulation	1/9/2006	22.8	0	1901
Solene	Solene/Chromagen Drain Back	SLCR32DC-80DB	Indirect Forced Circulation	3/15/2006	1.7	23099	3121
Solene	Solene/Chromagen Drain Back	SLCR40DC-80DB	Indirect Forced Circulation	3/15/2006	1.9	19460	3121
Solene	Solene/Chromagen Drain Back	SLCR64DC-80DB	Indirect Forced Circulation	3/15/2006	3.0	11157	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-80DB	Indirect Forced Circulation	3/15/2006	4.9	6060	2794
Solene	Solene/Chromagen Drain Back	SLCR60DC-80DB	Indirect Forced Circulation	3/15/2006	2.9	12047	3110
Solene	Solene/Chromagen Drain Back	SLCR64DC-120DB	Indirect Forced Circulation	11/7/2008	2.5	14441	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-120DB	Indirect Forced Circulation	11/7/2008	3.2	10818	2794
Solene	Solene/Chromagen Drain Back	SLCR32DC-80DB-XE	Indirect Forced Circulation	12/7/2006	1.5	26622	3121
Solene	Solene/Chromagen Drain Back	SLCR40DC-80DB-XE	Indirect Forced Circulation	12/7/2006	1.6	23382	3118
Solene	Solene/Chromagen Drain Back	SLCR64DC-80DB-XE	Indirect Forced Circulation	12/7/2006	2.3	15660	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-80DB-XE	Indirect Forced Circulation	12/7/2006	3.0	11880	2794
Solene	Solene/Chromagen Drain Back	SLCR64DC-120DB-XE	Indirect Forced Circulation	11/7/2008	2.0	18144	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-120DB-XE	Indirect Forced Circulation	11/7/2008	2.4	14580	3110
Solene	Solene/Chromagen PV Open Loop	SLCR32PV-66	Direct Forced Circulation	3/20/2006	2.4	17820	0
Solene	Solene/Chromagen PV Open Loop	SLCR40PV-80	Direct Forced Circulation	3/20/2006	3.2	13338	0
Solene	Solene/Chromagen PV Open Loop	SLCR60PV-80	Direct Forced Circulation	3/20/2006	29.7	1458	0
Solene	Solene/Chromagen PV Open Loop	SLCR64PV-120	Direct Forced Circulation	3/20/2006	999.9	0	0
Solene	Solene/Chromagen PV Open Loop	SLCR80PV-120	Direct Forced Circulation	3/20/2006	999.9	0	0
Solene	Solene/Corona DC Closed Loop	SLCO32DC-80HE	Indirect Forced Circulation	11/15/2006	1.7	22604	2927
Solene	Solene/Corona DC Closed Loop	SLCO40DC-80HE	Indirect Forced Circulation	11/15/2006	1.9	19373	2927
Solene	Solene/Corona DC Closed Loop	SLCO60DC-80HE	Indirect Forced Circulation	11/15/2006	2.3	15607	2906
Solene	Solene/Corona DC Closed Loop	SLCO64DC-80HE	Indirect Forced Circulation	11/15/2006	3.2	10707	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-80HE	Indirect Forced Circulation	11/15/2006	5.1	5946	2621
Solene	Solene/Corona DC Closed Loop	SLCO64DC-120HE	Indirect Forced Circulation	11/7/2008	2.6	14182	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-120HE	Indirect Forced Circulation	11/7/2008	3.4	10263	2621
Solene	Solene/Corona DC Closed Loop	SLCO32DC-80HE-XE	Indirect Forced Circulation	12/7/2006	1.5	26298	2927
Solene	Solene/Corona DC Closed Loop	SLCO40DC-80HE-XE	Indirect Forced Circulation	12/7/2006	1.6	23382	2927
Solene	Solene/Corona DC Closed Loop	SLCO64DC-80HE-XE	Indirect Forced Circulation	12/7/2006	2.4	15444	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-80HE-XE	Indirect Forced Circulation	12/7/2006	3.0	11610	2621

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Solene	Solene/Corona DC Closed Loop	SLCO64DC-120HE-XE	Indirect Forced Circulation	11/7/2008	2.1	17982	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-120HE-XE	Indirect Forced Circulation	11/7/2008	2.5	14580	2621
Solene	Solene/Corona DC Open Loop	SLCO32DC-66	Direct Forced Circulation	11/15/2006	2.1	18792	2117
Solene	Solene/Corona DC Open Loop	SLCO40DC-80	Direct Forced Circulation	11/15/2006	2.4	15822	2117
Solene	Solene/Corona DC Open Loop	SLCO60DC-80	Direct Forced Circulation	11/15/2006	3.3	11070	1901
Solene	Solene/Corona DC Open Loop	SLCO64DC-120	Direct Forced Circulation	11/15/2006	6.2	5076	1901
Solene	Solene/Corona DC Open Loop	SLCO80DC-120	Direct Forced Circulation	11/15/2006	22.8	0	1901
Solene	Solene/Corona Drainback	SLCO32DC-80DB	Indirect Forced Circulation	11/15/2006	1.6	23445	3110
Solene	Solene/Corona Drainback	SLCO40DC-80DB	Indirect Forced Circulation	11/15/2006	1.8	20366	3110
Solene	Solene/Corona Drainback	SLCO60DC-80DB	Indirect Forced Circulation	11/15/2006	2.2	16592	3110
Solene	Solene/Corona Drainback	SLCO64DC-80DB	Indirect Forced Circulation	11/15/2006	3.0	11804	2794
Solene	Solene/Corona Drainback	SLCO80DC-80DB	Indirect Forced Circulation	11/15/2006	4.2	7441	2794
Solene	Solene/Corona Drainback	SLCO64DC-120DB	Indirect Forced Circulation	11/7/2008	2.4	15226	2794
Solene	Solene/Corona Drainback	SLCO80DC-120DB	Indirect Forced Circulation	11/7/2008	3.1	11395	2794
Solene	Solene/Corona Drainback	SLCO32DC-80DB-XE	Indirect Forced Circulation	12/7/2006	1.4	27000	3110
Solene	Solene/Corona Drainback	SLCO40DC-80DB-XE	Indirect Forced Circulation	12/7/2006	1.6	24246	3110
Solene	Solene/Corona Drainback	SLCO64DC-80DB-XE	Indirect Forced Circulation	12/7/2006	2.3	16362	2794
Solene	Solene/Corona Drainback	SLCO80DC-80DB-XE	Indirect Forced Circulation	12/7/2006	2.8	12582	2794
Solene	Solene/Corona Drainback	SLCO64DC-120DB-XE	Indirect Forced Circulation	11/7/2008	2.0	18900	2794
Solene	Solene/Corona Drainback	SLCO80DC-120DB-XE	Indirect Forced Circulation	11/7/2008	2.4	15444	2794
Solene	Solene/Corona PV Open Loop	SLCO32PV-66	Direct Forced Circulation	11/15/2006	2.4	18252	0
Solene	Solene/Corona PV Open Loop	SLCO40PV-80	Direct Forced Circulation	11/15/2006	3.0	14580	0
Solene	Solene/Corona PV Open Loop	SLCO60PV-80	Direct Forced Circulation	11/15/2006	4.6	9450	0
Solene	Solene/Corona PV Open Loop	SLCO64PV-120	Direct Forced Circulation	11/15/2006	20.0	2160	0
Solene	Solene/Corona PV Open Loop	SLCO80PV-120	Direct Forced Circulation	11/15/2006	999.9	0	0
Stiebel Eltron	Solar Hot Water Package	SOLKIT-2-ETK	Indirect Forced Circulation		1.9	15822	6718
Stiebel Eltron	Solar Hot Water Package	SOLKIT-3-ETK	Indirect Forced Circulation		2.8	8910	6680
Stiebel Eltron	Solar Hot Water Package	SOLKIT-2-ET	Indirect Forced Circulation		2.0	15172	6685
Stiebel Eltron	Solar Hot Water Package	SOLKIT-3-ET	Indirect Forced Circulation		2.7	9110	6653
Stitt Energy Systems, Inc.	Sup.plen.ergy Solar Water Heater	SESI-80-40	Indirect Forced Circulation	8/7/2007	1.6	26401	0
Stitt Energy Systems, Inc.	Sup.plen.ergy Solar Water Heater	SESI-120-80	Indirect Forced Circulation	8/7/2007	2.1	20294	0

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
SunEarth, Inc.	Cascade	EPRD-40-80	Indirect Forced Circulation	6/10/2003	1.9	18030	5015
SunEarth, Inc.	Cascade	ECRD-40-80	Indirect Forced Circulation	6/10/2003	2.1	15984	4997
SunEarth, Inc.	Cascade	EPRD-42-80	Indirect Forced Circulation	6/10/2003	1.9	17698	5033
SunEarth, Inc.	Cascade	EPRD-48-80	Indirect Forced Circulation	6/10/2003	2.2	15288	4493
SunEarth, Inc.	Cascade	ECRD-48-80	Indirect Forced Circulation	6/10/2003	2.4	13682	4493
SunEarth, Inc.	Cascade	EPRD-64-80	Indirect Forced Circulation	6/10/2003	3.0	9983	4493
SunEarth, Inc.	Cascade	ECRD-64-80	Indirect Forced Circulation	6/10/2003	3.7	7318	4493
SunEarth, Inc.	Cascade	EPRD-40-80-2	Indirect Forced Circulation	6/10/2003	1.6	22896	5015
SunEarth, Inc.	Cascade	ECRD-40-80-2	Indirect Forced Circulation	6/10/2003	1.7	21060	4997
SunEarth, Inc.	Cascade	EPRD-42-80-2	Indirect Forced Circulation	6/10/2003	1.6	22572	5033
SunEarth, Inc.	Cascade	EPRD-48-80-2	Indirect Forced Circulation	6/10/2003	1.7	20358	4493
SunEarth, Inc.	Cascade	ECRD-48-80-2	Indirect Forced Circulation	6/10/2003	1.9	18792	4493
SunEarth, Inc.	Cascade	EPRD-64-80-2	Indirect Forced Circulation	6/10/2003	2.2	15390	4493
SunEarth, Inc.	Cascade	ECRD-64-80-2	Indirect Forced Circulation	6/10/2003	2.5	12960	4493
SunEarth, Inc.	CopperHeart	CP-30	Direct Integral Collector Storage	10/1/1992	1.4	30672	0
SunEarth, Inc.	CopperHeart	CP-40	Direct Integral Collector Storage	10/1/1992	1.5	28566	0
SunEarth, Inc.	CopperHeart	CP-60P	Direct Integral Collector Storage	10/1/1992	1.8	24732	0
SunEarth, Inc.	CopperHeart	CP-20	Direct Integral Collector Storage	10/11/1999	1.2	35478	0
SunEarth, Inc.	CopperHeart	CP-80P	Direct Integral Collector Storage	10/11/1999	2.0	22140	0
SunEarth, Inc.	SOLARAY	TE32P-80-1	Indirect Forced Circulation	3/23/1993	1.8	21946	2013
SunEarth, Inc.	SOLARAY	TE32C-80-1	Indirect Forced Circulation	3/23/1993	1.9	20383	2013
SunEarth, Inc.	SOLARAY	TE40P-80-1	Indirect Forced Circulation	3/23/1993	2.1	18488	2013
SunEarth, Inc.	SOLARAY	TE40C-80-1	Indirect Forced Circulation	3/23/1993	2.4	16491	1814
SunEarth, Inc.	SOLARAY	TE64P-80-1	Indirect Forced Circulation	3/18/1995	3.7	10007	1814
SunEarth, Inc.	SOLARAY	TE64C-80-1	Indirect Forced Circulation	3/18/1995	4.7	7308	1814
SunEarth, Inc.	SOLARAY	TE48P-80-1	Indirect Forced Circulation	4/10/2001	2.5	15397	1814
SunEarth, Inc.	SOLARAY	TE48C-80-1	Indirect Forced Circulation	4/10/2001	2.8	13738	1814
SunEarth, Inc.	SOLARAY	TE40C-120-1	Indirect Forced Circulation	12/18/2006	2.1	18684	1814
SunEarth, Inc.	SOLARAY	TE48P-120-1	Indirect Forced Circulation	12/18/2006	2.2	17755	1814
SunEarth, Inc.	SOLARAY	TE48C-120-1	Indirect Forced Circulation	12/18/2006	2.4	16148	1814
SunEarth, Inc.	SOLARAY	TE64P-120-1	Indirect Forced Circulation	12/18/2006	3.0	12548	1814
SunEarth, Inc.	SOLARAY	TE64C-120-1	Indirect Forced Circulation	12/18/2006	3.6	10272	1814

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
SunEarth, Inc.	SOLARAY	TE80P-120-1	Indirect Forced Circulation	12/18/2006	4.3	8287	1814
SunEarth, Inc.	SOLARAY	TE80C-120-1	Indirect Forced Circulation	12/18/2006	6.4	4923	1814
SunEarth, Inc.	SOLARAY	TE40P-120-1	Indirect Forced Circulation		1.9	20383	2013
SunEarth, Inc.	SOLARAY	TE32P-80-2	Indirect Forced Circulation	1/30/1996	1.6	24678	2013
SunEarth, Inc.	SOLARAY	TE32C-80-2	Indirect Forced Circulation	1/30/1996	1.7	23166	2013
SunEarth, Inc.	SOLARAY	TE40P-80-2	Indirect Forced Circulation	1/30/1996	1.8	21438	2013
SunEarth, Inc.	SOLARAY	TE40C-80-2	Indirect Forced Circulation	1/30/1996	2.0	19710	1814
SunEarth, Inc.	SOLARAY	TE64P-80-2	Indirect Forced Circulation	1/30/1996	2.8	13500	1814
SunEarth, Inc.	SOLARAY	TE64C-80-2	Indirect Forced Circulation	1/30/1996	3.4	11070	1814
SunEarth, Inc.	SOLARAY	TE48P-80-2	Indirect Forced Circulation	4/10/2001	2.1	18630	1814
SunEarth, Inc.	SOLARAY	TE48C-80-2	Indirect Forced Circulation	4/10/2001	2.3	17010	1814
SunEarth, Inc.	SOLARAY	TE40C-120-2	Indirect Forced Circulation	12/18/2006	1.9	21168	2013
SunEarth, Inc.	SOLARAY	TE48P-120-2	Indirect Forced Circulation	12/18/2006	1.9	20466	1814
SunEarth, Inc.	SOLARAY	TE48C-120-2	Indirect Forced Circulation	12/18/2006	2.1	18900	1814
SunEarth, Inc.	SOLARAY	TE64P-120-2	Indirect Forced Circulation	12/18/2006	2.4	15930	1814
SunEarth, Inc.	SOLARAY	TE64C-120-2	Indirect Forced Circulation	12/18/2006	2.8	13608	1814
SunEarth, Inc.	SOLARAY	TE80P-120-2	Indirect Forced Circulation	12/18/2006	3.2	11880	1814
SunEarth, Inc.	SOLARAY	TE80C-120-2	Indirect Forced Circulation	12/18/2006	3.9	9288	1814
SunEarth, Inc.	SOLARAY	TE40C-80-2-PV	Indirect Forced Circulation	2/26/2001	1.9	22626	0
SunEarth, Inc.	SOLARAY	TE64C-80-2-PV	Indirect Forced Circulation	2/26/2001	2.9	14904	0
SunEarth, Inc.	SOLARAY	TE40P-80-2-PV	Indirect Forced Circulation	2/26/2001	1.8	24462	0
SunEarth, Inc.	SOLARAY	TE64P-80-2-PV	Indirect Forced Circulation	2/26/2001	2.5	17280	0
SunEarth, Inc.	SOLARAY	TE48P-80-2-PV	Indirect Forced Circulation	4/10/2001	2.0	21762	0
SunEarth, Inc.	SOLARAY	TE48C-80-2-PV	Indirect Forced Circulation	4/10/2001	2.1	20142	0
SunEarth, Inc.	SOLARAY	TE40C-120-2-PV	Indirect Forced Circulation	12/18/2006	1.8	24030	0
SunEarth, Inc.	SOLARAY	TE48P-120-2-PV	Indirect Forced Circulation	12/18/2006	1.9	23328	0
SunEarth, Inc.	SOLARAY	TE48C-120-2-PV	Indirect Forced Circulation	12/18/2006	2.0	21816	0
SunEarth, Inc.	SOLARAY	TE64P-120-2-PV	Indirect Forced Circulation	12/18/2006	2.3	19224	0
SunEarth, Inc.	SOLARAY	TE64C-120-2-PV	Indirect Forced Circulation	12/18/2006	2.5	17064	0
SunEarth, Inc.	SOLARAY	TE80P-120-2-PV	Indirect Forced Circulation	12/18/2006	2.7	15822	0
SunEarth, Inc.	SOLARAY	TE80C-120-2-PV	Indirect Forced Circulation	12/18/2006	3.3	13230	0
SunEarth, Inc.	SOLARAY	TE40C-80-PV	Indirect Forced Circulation	2/26/2001	2.2	19650	0

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
SunEarth, Inc.	SOLARAY	TE64C-80-PV	Indirect Forced Circulation	2/26/2001	3.8	11330	0
SunEarth, Inc.	SOLARAY	TE40P-80-PV	Indirect Forced Circulation	2/26/2001	2.0	21714	0
SunEarth, Inc.	SOLARAY	TE48P-80-PV	Indirect Forced Circulation	4/10/2001	2.3	18786	0
SunEarth, Inc.	SOLARAY	TE48C-80-PV	Indirect Forced Circulation	4/10/2001	2.5	16992	0
SunEarth, Inc.	SOLARAY	TE40C-120-PV	Indirect Forced Circulation	12/18/2006	2.0	21583	0
SunEarth, Inc.	SOLARAY	TE48P-120-PV	Indirect Forced Circulation	12/18/2006	2.1	20804	0
SunEarth, Inc.	SOLARAY	TE48C-120-PV	Indirect Forced Circulation	12/18/2006	2.3	19177	0
SunEarth, Inc.	SOLARAY	TE64C-120-PV	Indirect Forced Circulation	12/18/2006	3.1	13950	0
SunEarth, Inc.	SOLARAY	TE80P-120-PV	Indirect Forced Circulation	12/18/2006	3.4	12797	0
SunEarth, Inc.	SOLARAY	TE80C-120-PV	Indirect Forced Circulation	12/18/2006	4.3	9998	0
SunEarth, Inc.	SunSaver	NF40P-80T	Direct Forced Circulation	10/27/1995	2.3	15552	2927
SunEarth, Inc.	SunSaver	NF40P-80S	Direct Forced Circulation	10/27/1995	2.2	16524	2927
SunEarth, Inc.	SunSiphon	EPGX48-21-2	Indirect Thermosyphon	5/20/2001	1.2	35100	0
SunEarth, Inc.	SunSiphon	EPGX48-24-2	Indirect Thermosyphon	5/20/2001	1.3	33858	0
SunEarth, Inc.	SunSiphon	EPGX48-32-2	Indirect Thermosyphon	5/20/2001	1.4	31266	0
SunEarth, Inc.	SunSiphon	EPGX80-40-2	Indirect Thermosyphon	5/20/2001	1.5	28620	0
SunEarth, Inc.	SunSiphon	EPGX80-42-2	Indirect Thermosyphon	5/20/2001	1.5	28188	0
SunEarth, Inc.	SunSiphon	EPGX80-48-2	Indirect Thermosyphon	5/20/2001	1.6	26460	0
SunEarth, Inc.	SunSiphon	EPGX80-63-2	Indirect Thermosyphon	5/20/2001	1.8	23544	0
SunEarth, Inc.	SunSiphon	EPGX80-64-2	Indirect Thermosyphon	5/20/2001	1.9	23112	0
SunEarth, Inc.	SunSiphon	EPGX116-63-2	Indirect Thermosyphon	5/20/2001	1.9	23112	0
SunEarth, Inc.	SunSiphon	EPGX116-64-2	Indirect Thermosyphon	5/20/2001	1.9	22680	0
SunEarth, Inc.	SunSiphon	EPGX116-80-2	Indirect Thermosyphon	5/20/2001	2.2	19980	0
SunEarth, Inc.	SunSource	HX40P-80	Indirect Forced Circulation	2/9/1996	2.1	19170	1781
SunEarth, Inc.	SunSource	HX64P-120	Indirect Forced Circulation	2/9/1996	3.2	11610	1768
Synergy Solar	Drainback Stainless HX	60-2T	Indirect Forced Circulation	6/4/2007	2.2	14580	4762
Synergy Solar	Drainback Stainless HX	53-2T	Indirect Forced Circulation	6/4/2007	2.1	15930	4781
Synergy Solar	Drainback Stainless HX	80-2T	Indirect Forced Circulation	6/4/2007	3.2	8640	4723
Synergy Solar	Drainback Stainless HX	107-2T	Indirect Forced Circulation	6/4/2007	6.1	2430	4704
Synergy Solar	Drainback Stainless HX	S53-2T	Indirect Forced Circulation	6/4/2007	1.7	20088	4762
Synergy Solar	Drainback Stainless HX	133-2T	Indirect Forced Circulation	6/4/2007	9.1	162	4585
Synergy Solar	Drainback Stainless HX	40-1T	Indirect Forced Circulation	6/4/2007	1.8	17658	6590

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH ELECTRIC AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Synergy Solar	Drainback Stainless HX	53-1T	Indirect Forced Circulation	6/4/2007	2.3	12150	6521
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-30-CN	Direct Integral Collector Storage	4/9/1997	1.4	30780	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-35-CN	Direct Integral Collector Storage	4/9/1997	1.4	30618	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN	Direct Integral Collector Storage	4/9/1997	1.6	26838	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-50-CN	Direct Integral Collector Storage	4/9/1997	1.6	26622	0
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 30-R80	Indirect Forced Circulation	2/21/2002	2.2	16509	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 40-R80	Indirect Forced Circulation	2/21/2002	3.6	9264	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 50-R80	Indirect Forced Circulation	1/26/2007	9.8	1508	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 60-R80	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 70-R80	Indirect Forced Circulation	1/26/2007	16.2	0	2672
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 80-R80	Indirect Forced Circulation	1/26/2007	17.6	0	2458
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 90-R80	Indirect Forced Circulation	1/26/2007	19.0	0	2274
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 30-R120	Indirect Forced Circulation	1/26/2007	1.9	19335	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 40-R120	Indirect Forced Circulation	1/26/2007	2.8	12335	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 50-R120	Indirect Forced Circulation	1/26/2007	5.0	5737	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 60-R120	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 70-R120	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 80-R120	Indirect Forced Circulation	1/26/2007	16.6	0	2611
Thermomax Industries Ltd.	Thermomax Mazdon	Mazdon 90-R120	Indirect Forced Circulation	1/26/2007	18.0	0	2407
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 20R-R80	Indirect Forced Circulation	6/30/2004	1.5	25860	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 30R-R80	Indirect Forced Circulation	6/30/2004	1.9	19647	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 40R-R80	Indirect Forced Circulation	6/30/2004	2.5	14274	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 50R-R80	Indirect Forced Circulation	6/30/2004	3.5	9570	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 60R-R80	Indirect Forced Circulation	6/30/2004	5.8	4587	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 70R-R80	Indirect Forced Circulation	1/26/2007	11.8	753	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 80R-R80	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 90R-R80	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 20R-R120	Indirect Forced Circulation	1/26/2007	1.4	28254	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 30R-R120	Indirect Forced Circulation	1/26/2007	1.7	22208	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 40R-R120	Indirect Forced Circulation	1/26/2007	2.1	17365	2927

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 50R-R120	Indirect Forced Circulation	1/26/2007	2.8	12654	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 60R-R120	Indirect Forced Circulation	1/26/2007	3.6	9030	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 70R-R120	Indirect Forced Circulation	1/26/2007	5.8	4509	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 80R-R120	Indirect Forced Circulation	1/26/2007	12.8	445	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 90R-R120	Indirect Forced Circulation	1/26/2007	14.8	0	2927
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 20W	Indirect Forced Circulation	6/30/2004	1.2	35618	1672
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 30W	Indirect Forced Circulation	6/30/2004	1.7	23198	2570
Thermomax Industries Ltd.	Thermomax Solamax	Solamax 40W	Indirect Forced Circulation	6/30/2004	2.1	18174	2621
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-112-2EP40FP-Elec	Indirect Forced Circulation	7/2/2001	2.1	18360	2650
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-199-3EP40FP-Elec	Indirect Forced Circulation	7/2/2001	2.4	15336	2650
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-199-4EP40FP-Elec	Indirect Forced Circulation	7/2/2001	3.3	10638	2340
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-299-5EP40FP-Elec	Indirect Forced Circulation	7/2/2001	5.4	5670	2340
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-299-6EP40FP-Elec	Indirect Forced Circulation	7/2/2001	6.0	4860	2340
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 218 EL B/U	Indirect Forced Circulation	11/10/2008	3.6	9612	2353
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 318 EL B/U	Indirect Forced Circulation	11/10/2008	18.4	0	2353
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 218 AUX EL	Indirect Forced Circulation	11/10/2008	2.7	13824	2353
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 318 AUX EL	Indirect Forced Circulation	11/10/2008	5.3	5832	2353
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	2-200F-80R-E	Indirect Forced Circulation	1/13/2009	2.8	12736	2765
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	3-200F-120R-E	Indirect Forced Circulation	1/13/2009	4.3	7301	2765

*** OG300 Column Headings:**

SEF Solar Energy Factor:

$$SEF = \frac{Q_{DEL}}{Q_{AUX} + Q_{PAR}}$$

Where:

Q_{DEL} = Daily amount of energy delivered to the hot water load using the SRCC rating conditions, this value is 43,302 kJ/day. To convert to kWh, divide this value by 3,600.

Q_{AUX} = Daily amount of energy used by the auxiliary water heater or backup element, with the solar system operating (kJ/day). To convert to kWh, divide this value by 3,600.

Q_{PAR} = Parasitic energy: Daily amounts of AC electrical energy used to power pumps, controllers, shutters, trackers, or any other item needed to operate the SDHW system (kJ/day). To convert to kWh, divide this value by 3,600.

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SYSTEMS CERTIFIED WITH GAS AUXILIARY

COMPARING SYSTEM COSTS FOR SYSTEMS WITH A GAS AUXILIARY

The Energy Factor (EF) and the Solar Energy Factor (SEF) can be used to compare different water heating systems with one another and to estimate typical yearly operating costs for the specified rating conditions. Note that the performance any individual consumer will experience may differ due to location and hot water usage. The SEF includes all of the conditions specified for the DOE EF test, plus several solar specific conditions. The EF and SEF can be used to compare solar and gas system's energy use on a one-to-one basis. For gas systems, the following calculation can be used:

$$\text{Yearly Cost (\$)} = 365 \text{ days} * 0.4105 / \text{EF} * \$x/\text{therm}$$

Examples:

Assume that gas costs \$1.60/therm

1. TYPICAL GAS WATER HEATER (EF=0.6)

$$\text{YEARLY COST} = 365 * 0.4105 / 0.6 * 1.60 = \$399.55$$

2. TYPICAL SOLAR SYSTEM (SEF=1.1)

$$\text{YEARLY COST} = 365 * 0.4105 / 1.1 * 1.60 = \$217.94$$

Note that the solar system saves \$181.61 (\$399.55 - \$217.94) per year. This figure can be used as the energy cost savings basis for an economic analysis of a solar hot water system based on the assumptions for the standard DOE (EF) and SRCC OG 300 (SEF) rating conditions. Other factors such as initial cost, maintenance, inflation, interest rate, and replacement costs also need to be considered when making an economic analysis.

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH GAS AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
ACR Solar International	Skyline System 3	200132C502TG	Direct Forced Circulation	12/9/2002	1.0	43446	318
ACR Solar International	Skyline System 3	200132C50T20G	Direct Forced Circulation	12/9/2002	1.0	43803	0
ACR Solar International	Skyline System 5	200152C80EX2TG	Indirect Forced Circulation	12/9/2002	0.9	48076	0
ACR Solar International	Skyline System 5	200153C80EX2TG	Indirect Forced Circulation	12/9/2002	1.0	42734	0
BTF, Ltd.	Solar Patriot™	SP20-1-65G-DT-G	Indirect Forced Circulation	3/1/2007	0.8	50569	2765
BTF, Ltd.	Solar Patriot™	SP20-2-80G-DT-G	Indirect Forced Circulation	3/1/2007	1.1	37214	2765
Butler Sun Solutions	Solar Butler	BSS-S1-40Ga	Indirect Forced Circulation	7/1/2004	0.7	60044	1123
Butler Sun Solutions	Solar Butler	BSS-S1-40Gb	Indirect Forced Circulation	7/1/2004	0.7	65106	1004
Butler Sun Solutions	Solar Butler	BSS-S1-50Ga	Indirect Forced Circulation	7/1/2004	0.8	55135	1123
Butler Sun Solutions	Solar Butler	BSS-S1-80Ga	Indirect Forced Circulation	7/1/2004	0.8	54155	1123
Butler Sun Solutions	Solar Butler	BSS-S1-80Gc	Indirect Forced Circulation	7/1/2004	0.7	59133	1123
Butler Sun Solutions	Solar Butler	BSS-S1-50Gc	Indirect Forced Circulation	7/1/2004	0.7	56861	1012
Butler Sun Solutions	Solar Butler	BSS-S1-40Gc	Indirect Forced Circulation	8/29/2005	0.7	57987	1012
Butler Sun Solutions	Solar Butler	BSS-PV1-40Ga	Indirect Forced Circulation	9/15/2005	1.0	41379	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Gb	Indirect Forced Circulation	9/15/2005	0.9	48914	0
Butler Sun Solutions	Solar Butler	BSS-PV1-50Ga	Indirect Forced Circulation	9/15/2005	1.2	36090	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80Ga	Indirect Forced Circulation	9/15/2005	1.3	33520	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80Gc	Indirect Forced Circulation	9/15/2005	1.1	39329	0
Butler Sun Solutions	Solar Butler	BSS-PV1-50Gc	Indirect Forced Circulation	9/15/2005	1.1	38195	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Gc	Indirect Forced Circulation	9/15/2005	1.1	38982	0
Butler Sun Solutions	Solar Butler	BSS-PV1-50Gb	Indirect Forced Circulation	11/14/2007	1.3	32539	0
Butler Sun Solutions	Solar Butler	BSS-PV1-40Gd	Indirect Forced Circulation	2/11/2008	1.2	36789	0
Butler Sun Solutions	Solar Butler	BSS-S1-80G2a	Indirect Forced Circulation	9/15/2005	0.9	47132	1242
Butler Sun Solutions	Solar Butler	BSS-S1-80G2b	Indirect Forced Circulation	9/15/2005	1.0	42056	1242
Butler Sun Solutions	Solar Butler	BSS-PV1-80G2a	Indirect Forced Circulation	9/15/2005	0.9	48523	0
Butler Sun Solutions	Solar Butler	BSS-PV1-80G2b	Indirect Forced Circulation	9/15/2005	1.0	43619	0
Davis Energy Group	SunCache	SCU-50-GS	Indirect Integral Collector Storage	6/2/2008	0.7	63389	0
Davis Energy Group	SunCache	SCU-50-GTL	Indirect Integral Collector Storage	6/2/2008	0.9	48816	138
Davis Energy Group	SunCache	SCG-50-GS	Indirect Integral Collector Storage	6/2/2008	0.7	59828	0
Davis Energy Group	SunCache	SCG-100-GS	Indirect Integral Collector Storage	6/2/2008	0.8	55911	0
Davis Energy Group	SunCache	SCG-50-GTL	Indirect Integral Collector Storage	6/2/2008	1.0	45434	138
Davis Energy Group	SunCache	SCG-100-GTL	Indirect Integral Collector Storage	6/2/2008	1.1	41084	138

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH GAS AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Enerworks, Inc.	Solar Water Heating Appliance	EWRA1-G40	Indirect Forced Circulation	2/9/2007	1.0	43803	999
Enerworks, Inc.	Solar Water Heating Appliance	EWRA1-G80	Indirect Forced Circulation	2/9/2007	1.0	43981	1115
Enerworks, Inc.	Solar Water Heating Appliance	EWRA2-G80	Indirect Forced Circulation	2/9/2007	1.2	32051	3208
Enerworks, Inc.	Solar Water Heating Appliance	EWRA2-G100	Indirect Forced Circulation	2/9/2007	1.2	34009	3234
Enerworks, Inc.	Solar Water Heating Appliance	EWRA3-G100	Indirect Forced Circulation	2/9/2007	1.4	27421	3143
Enerworks, Inc.	Solar Water Heating Appliance	EWRA3-G120	Indirect Forced Circulation	2/9/2007	1.4	27777	3164
Enerworks, Inc.	Solar Water Heating Appliance	EWRA4-G120	Indirect Forced Circulation	2/9/2007	1.7	22257	3132
Enerworks, Inc.	Solar Water Heating Appliance	EWRA4-G144	Indirect Forced Circulation	2/9/2007	1.5	24928	3143
Fafco, Inc.	Polymer Drainback	VDB-48U-50G-50S	Indirect Forced Circulation	4/3/2007	0.8	48788	3183
Fafco, Inc.	Polymer Drainback	VDB-48U-50G-80S	Indirect Forced Circulation	4/3/2007	0.8	48788	3183
Fafco, Inc.	Polymer Drainback	VDB-48UX2-50G-50S	Indirect Forced Circulation	2/7/2007	0.9	44515	2874
Fafco, Inc.	Polymer Drainback	VDB-48UX2-50G-80S	Indirect Forced Circulation	2/7/2007	0.9	44515	2955
Heat Transfer Products	Phoenix Solar	PH-80S	Indirect Forced Circulation	3/20/2008	1.5	24924	3073
Heat Transfer Products	Phoenix Solar	PH-119S	Indirect Forced Circulation	3/20/2008	2.3	15727	2821
Heat Transfer Products	SuperStor Contender Solar	SSC-50SB	Indirect Forced Circulation	3/5/2008	1.7	20811	4916
Heat Transfer Products	SuperStor Contender Solar	SSC-80SB	Indirect Forced Circulation	3/5/2008	1.9	18575	4737
Heat Transfer Products	SuperStor Contender Solar	SSC-119SB	Indirect Forced Circulation	3/5/2008	2.4	13378	4334
Heat Transfer Products	SuperStor Ultra Solar	SSU-60SB	Indirect Forced Circulation	3/5/2008	1.6	21991	5013
Heat Transfer Products	SuperStor Ultra Solar	SSU-80SB	Indirect Forced Circulation	3/5/2008	1.9	18291	4716
Heat Transfer Products	SuperStor Ultra Solar	SSU-119SB	Indirect Forced Circulation	3/5/2008	2.3	14416	4419
Heat Transfer Products	SuperStor Ultra Solar	SSU-80SB-DW	Indirect Forced Circulation	3/5/2008	1.8	19066	4780
Heat Transfer Products	SuperStor Ultra Solar	SSU-119SB-DW	Indirect Forced Circulation	3/5/2008	2.4	13885	4216
Heliodyne, Inc.	Helio-Flo	HF 13366 G 50 AC D Z	Direct Forced Circulation	10/25/2004	1.0	43268	1145
Heliodyne, Inc.	Helio-Flo	HF 1408 G 50 AC D Z	Direct Forced Circulation	10/25/2004	1.1	39707	1145
Heliodyne, Inc.	Helio-Flo	HF 1410 G 80 AC D Z	Direct Forced Circulation	10/25/2004	1.2	34722	1145
Heliodyne, Inc.	Helio-Flo	HF 23366 G 80 AC D Z	Direct Forced Circulation	10/25/2004	1.6	26709	1145
Heliodyne, Inc.	Helio-Flo	HF 2408 G 80 AC D Z	Direct Forced Circulation	10/25/2004	1.9	21901	1037
Heliodyne, Inc.	Helio-Flo	HF 2408 G 120 AC D Z	Direct Forced Circulation	10/25/2004	1.8	22792	1145
Heliodyne, Inc.	Helio-Flo	HF 2410 G 120 AC D Z	Direct Forced Circulation	10/25/2004	2.6	15313	1037
Heliodyne, Inc.	Helio-Flo	HF 3408 G 120 AC D Z	Direct Forced Circulation	10/25/2004	3.3	10684	2621
Heliodyne, Inc.	Helio-Flo	HF 3410 G 120 AC D Z	Direct Forced Circulation	10/25/2004	4.6	7122	2315
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 65 ACD Z	Indirect Forced Circulation	4/16/1998	1.1	35612	4133
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 408 G 80 ACD Z	Indirect Forced Circulation	4/16/1998	1.5	23860	4331

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 408 G 120 ACD Z	Indirect Forced Circulation	4/16/1998	1.5	24928	4331
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 410 G 120 ACD Z	Indirect Forced Circulation	4/16/1998	1.9	18696	4331
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 ACD Z	Indirect Forced Circulation	4/16/1998	1.0	40419	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 3366 G 80 ACD Z	Indirect Forced Circulation	7/9/2001	0.9	44337	4178
Heliodyne, Inc.	Heliopak	16 DWCL HP 2 3366 G 80 ACD Z	Indirect Forced Circulation	7/9/2001	1.3	29380	3788
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 80 ACD Z	Indirect Forced Circulation	7/9/2001	1.0	40776	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 ACD Z	Indirect Forced Circulation	7/9/2001	1.1	35968	4163
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 410 G 80 PVD Z	Indirect Forced Circulation	4/16/1998	1.1	39707	0
Heliodyne, Inc.	Heliopak	16 DWCL HP 1 408 G 65 PVD Z	Indirect Forced Circulation	7/15/1998	1.0	43981	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 3366 G PV 50 EE D Z	Indirect Forced Circulation	4/28/2006	1.0	44871	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 408 G PV 50 EE D Z	Indirect Forced Circulation	4/28/2006	1.0	41488	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 1 410 G PV 80 EE D Z	Indirect Forced Circulation	4/28/2006	1.2	37214	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 3366 G PV 80 EE D Z	Indirect Forced Circulation	4/28/2006	1.4	31160	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 408 G PV 80 EE D Z	Indirect Forced Circulation	4/28/2006	1.6	27243	0
Heliodyne, Inc.	Helio-Pak Helix SS PV	HP HX SS 2 410 G PV 120 SE D Z	Indirect Forced Circulation	4/28/2006	1.9	22435	0
Integrated Solar, LLC	CopperSun	CS440-G	Direct Integral Collector Storage	1/19/1999	0.9	48610	0
Integrated Solar, LLC	CopperSun	CS330-G	Direct Integral Collector Storage	4/24/2000	0.8	52349	0
Integrated Solar, LLC	CopperSun	CS340-G	Direct Integral Collector Storage	4/24/2000	0.8	52705	0
Integrated Solar, LLC	CopperSun	CS450-G	Direct Integral Collector Storage	4/24/2000	0.9	49322	0
Integrated Solar, LLC	CopperSun	CS330SV-G	Direct Integral Collector Storage	5/22/2003	0.8	54308	0
Integrated Solar, LLC	CopperSun	CS340SV-G	Direct Integral Collector Storage	5/22/2003	0.8	54842	0
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-65-GD-40P	Indirect Forced Circulation	7/13/1998	0.9	41488	5808
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-8-80-GD-64P	Indirect Forced Circulation	7/13/1998	1.1	33831	5808
Integrated Solar, LLC	Radco Drainback Heat Exchanger	R-DBHX-12-120-GD-80P	Indirect Forced Circulation	7/13/1998	1.2	31516	5434
Mr. Sun Solar	Sol-Reliant	SR 56/80 G PVDB	Indirect Forced Circulation	12/9/2004	1.4	30448	0
Mr. Sun Solar	Sol-Reliant	SR 40/80 G PVDB	Indirect Forced Circulation	10/16/2006	1.1	38817	0
Mr. Sun Solar	Sol-Reliant	SR80/80 G PVDB	Indirect Forced Circulation	1/30/2008	1.9	22614	0
Mr. Sun Solar	Sol-Reliant	SR112/80 G PVDB	Indirect Forced Circulation	1/30/2008	3.3	13176	0
Mr. Sun Solar	Sol-Reliant	SR112/120 G PVDB	Indirect Forced Circulation	1/30/2008	2.6	16738	0
Oventrop Corporation	OVSOL System 5	OV-5 Regusol Indirect	Indirect Forced Circulation	4/8/2008	0.8	52349	2765
Schuco USA L.P.	Premium Package	Premium II-80G	Indirect Forced Circulation	4/16/2007	1.2	32407	2755
Schuco USA L.P.	Premium Package	Premium III-120G	Indirect Forced Circulation	4/16/2007	1.5	27065	2755
Schuco USA L.P.	Slimline Package	Slimline II-80G	Indirect Forced Circulation	4/16/2007	1.1	35612	2765

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Schuco USA L.P.	Slimline Package	Slimline III-120G	Indirect Forced Circulation	4/16/2007	1.3	29736	2755
Solahart Industries	SOLAHART	ASG 181L	Direct Thermosyphon	3/28/2003	0.8	52171	0
Solahart Industries	SOLAHART	ASG 302L	Direct Thermosyphon	3/28/2003	1.0	43268	0
Solahart Industries	SOLAHART	ASG 303L	Direct Thermosyphon	3/28/2003	1.2	37392	0
Solahart Industries	SOLAHART	ASG 443L	Direct Thermosyphon	3/28/2003	1.1	38105	0
Solahart Industries	SOLAHART	ASG 444L	Direct Thermosyphon	3/28/2003	1.3	34543	0
Solahart Industries	SOLAHART	ASG 181J & ASG 181J Free Heat	Indirect Thermosyphon	3/28/2003	0.8	51815	0
Solahart Industries	SOLAHART	ASG 182J & ASG 182J Free Heat	Indirect Thermosyphon	3/28/2003	1.0	43803	0
Solahart Industries	SOLAHART	ASG 302J & ASG 302J Free Heat	Indirect Thermosyphon	3/28/2003	1.0	43981	0
Solahart Industries	SOLAHART	ASG 302JXII	Indirect Thermosyphon	3/28/2003	1.0	43981	0
Solahart Industries	SOLAHART	ASG 303J & ASG 302J Free Heat	Indirect Thermosyphon	3/28/2003	1.1	39173	0
Solahart Industries	SOLAHART	ASG 303JXII	Indirect Thermosyphon	3/28/2003	1.1	39173	0
Solahart Industries	SOLAHART	ASG 443J & ASG 443J Free Heat	Indirect Thermosyphon	3/28/2003	1.1	39351	0
Solahart Industries	SOLAHART	ASG 443JXII	Indirect Thermosyphon	3/28/2003	1.1	39351	0
Solahart Industries	SOLAHART	ASG 444J & ASG 444J Free Heat	Indirect Thermosyphon	3/28/2003	1.2	36502	0
Solahart Industries	SOLAHART	ASG 444JXII	Indirect Thermosyphon	3/28/2003	1.2	36502	0
Solahart Industries	SOLAHART	ASG 181KF & ASG 181KF Free Heat	Indirect Thermosyphon	3/28/2003	0.9	50569	0
Solahart Industries	SOLAHART	ASG 181BCXII	Indirect Thermosyphon	3/28/2003	0.9	50569	0
Solahart Industries	SOLAHART	ASG 182KF & ASG 182KF Free Heat	Indirect Thermosyphon	3/28/2003	1.1	39885	0
Solahart Industries	SOLAHART	ASG 182BCXII	Indirect Thermosyphon	3/28/2003	1.1	39885	0
Solahart Industries	SOLAHART	ASG 302KF & ASG 302KF Free Heat	Indirect Thermosyphon	3/28/2003	1.1	40241	0
Solahart Industries	SOLAHART	ASG 302BCXII	Indirect Thermosyphon	3/28/2003	1.1	40241	0
Solahart Industries	SOLAHART	ASG 303KF & ASG 303KF Free Heat	Indirect Thermosyphon	3/28/2003	1.3	33475	0
Solahart Industries	SOLAHART	ASG 303BCXII	Indirect Thermosyphon	3/28/2003	1.3	33475	0
Solahart Industries	SOLAHART	ASG 443KF & ASG 443KF Free Heat	Indirect Thermosyphon	3/28/2003	1.3	33831	0
Solahart Industries	SOLAHART	ASG 443BCXII	Indirect Thermosyphon	3/28/2003	1.3	33831	0
Solahart Industries	SOLAHART	ASG 444KF & ASG 444KF Free Heat	Indirect Thermosyphon	3/28/2003	1.5	29202	0
Solahart Industries	SOLAHART	ASG 444BCXII	Indirect Thermosyphon	3/28/2003	1.5	29202	0
Solene	Solene/Chromagen DC Closed Loop	SLCR32DC-80HE-XG	Indirect Forced Circulation	12/7/2006	0.9	43624	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR40DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.0	39173	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.4	28846	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.7	23504	2621
Solene	Solene/Chromagen DC Closed Loop	SLCR64DC-120HE-XG	Indirect Forced Circulation	11/7/2008	1.2	32407	2927
Solene	Solene/Chromagen DC Closed Loop	SLCR80DC-120HE-XG	Indirect Forced Circulation	11/7/2008	1.4	27599	2927
Solene	Solene/Chromagen Drain Back	SLCR32DC-80DB-XG	Indirect Forced Circulation	12/7/2006	0.9	44515	3121

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System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
Solene	Solene/Chromagen Drain Back	SLCR40DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.0	40419	3121
Solene	Solene/Chromagen Drain Back	SLCR64DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.3	30270	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.6	24928	2794
Solene	Solene/Chromagen Drain Back	SLCR64DC-120DB-XG	Indirect Forced Circulation	11/7/2008	1.2	33831	3110
Solene	Solene/Chromagen Drain Back	SLCR80DC-120DB-XG	Indirect Forced Circulation	11/7/2008	1.4	28489	3110
Solene	Solene/Corona DC Closed Loop	SLCO32DC-80HE-XG	Indirect Forced Circulation	12/7/2006	0.9	44159	2927
Solene	Solene/Corona DC Closed Loop	SLCO40DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.0	40419	2927
Solene	Solene/Corona DC Closed Loop	SLCO64DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.3	29736	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-80HE-XG	Indirect Forced Circulation	12/7/2006	1.6	24394	2621
Solene	Solene/Corona DC Closed Loop	SLCO64DC-120HE-XG	Indirect Forced Circulation	11/7/2008	1.2	33297	2621
Solene	Solene/Corona DC Closed Loop	SLCO80DC-120HE-XG	Indirect Forced Circulation	11/7/2008	1.4	28489	2621
Solene	Solene/Corona DC Open Loop	SLCO32DC-80-XG	Direct Forced Circulation	8/31/2007	1.1	37570	2927
Solene	Solene/Corona DC Open Loop	SLCO40DC-80-XG	Direct Forced Circulation	8/31/2007	1.2	33475	2621
Solene	Solene/Corona DC Open Loop	SLCO64DC-80-XG	Direct Forced Circulation	8/31/2007	2.0	18874	2621
Solene	Solene/Corona DC Open Loop	SLCO80DC-80-XG	Direct Forced Circulation	8/31/2007	2.4	16025	2315
Solene	Solene/Corona Drainback	SLCO32DC-80DB-XG	Indirect Forced Circulation	12/7/2006	0.9	45049	3110
Solene	Solene/Corona Drainback	SLCO40DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.0	41310	3110
Solene	Solene/Corona Drainback	SLCO64DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.3	31160	2794
Solene	Solene/Corona Drainback	SLCO80DC-80DB-XG	Indirect Forced Circulation	12/7/2006	1.5	25819	2794
Solene	Solene/Corona Drainback	SLCO64DC-120DB-XG	Indirect Forced Circulation	11/7/2008	1.2	34722	2794
Solene	Solene/Corona Drainback	SLCO80DC-120DB-XG	Indirect Forced Circulation	11/7/2008	1.3	29914	2794
Stiebel Eltron	Solar Hot Water Package	SOLKIT-2-GTK	Indirect Forced Circulation		1.0	37214	6696
Stiebel Eltron	Solar Hot Water Package	SOLKIT-3-GTK	Indirect Forced Circulation		1.2	29202	6653
Stiebel Eltron	Solar Hot Water Package	SOLKIT-2-GT	Indirect Forced Circulation		1.6	20647	6823
Stiebel Eltron	Solar Hot Water Package	SOLKIT-3-GT	Indirect Forced Circulation		2.2	12469	6791
SunEarth, Inc.	Cascade	EPRD-40-80-2G	Indirect Forced Circulation	6/10/2003	1.0	39707	5015
SunEarth, Inc.	Cascade	ECRD-40-80-2G	Indirect Forced Circulation	6/10/2003	1.0	37214	4999
SunEarth, Inc.	Cascade	EPRD-42-80-2G	Indirect Forced Circulation	6/10/2003	1.0	39173	5033
SunEarth, Inc.	Cascade	EPRD-48-80-2G	Indirect Forced Circulation	6/10/2003	1.1	36324	4493
SunEarth, Inc.	Cascade	ECRD-48-80-2G	Indirect Forced Circulation	6/10/2003	1.1	34365	4493
SunEarth, Inc.	Cascade	EPRD-64-80-2G	Indirect Forced Circulation	6/10/2003	1.3	29736	4493
SunEarth, Inc.	Cascade	ECRD-64-80-2G	Indirect Forced Circulation	6/10/2003	1.4	26709	4493
SunEarth, Inc.	Cascade	EPRD-64-80-75G	Indirect Forced Circulation	8/13/2003	1.0	41003	4493

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SunEarth, Inc.	Cascade	EPRD-64-80-100G	Indirect Forced Circulation	8/13/2003	0.9	43355	4493
SunEarth, Inc.	CopperHeart	CP-20G	Direct Integral Collector Storage	4/10/2001	0.8	56979	0
SunEarth, Inc.	CopperHeart	CP-30G	Direct Integral Collector Storage	4/10/2001	0.9	50569	0
SunEarth, Inc.	CopperHeart	CP-40G	Direct Integral Collector Storage	4/10/2001	0.9	47720	0
SunEarth, Inc.	CopperHeart	CP-60PG	Direct Integral Collector Storage	4/10/2001	1.0	42734	0
SunEarth, Inc.	CopperHeart	CP-80PG	Direct Integral Collector Storage	4/10/2001	1.1	39173	0
SunEarth, Inc.	CopperHeart	CP-20-TLG	Direct Integral Collector Storage	8/19/2002	1.0	43494	138
SunEarth, Inc.	CopperHeart	CP-30-TLG	Direct Integral Collector Storage	8/19/2002	1.2	36835	138
SunEarth, Inc.	CopperHeart	CP-40-TLG	Direct Integral Collector Storage	8/19/2002	1.3	33885	138
SunEarth, Inc.	SOLARAY	TE40P-80-2G	Indirect Forced Circulation	4/10/2001	1.1	38817	2013
SunEarth, Inc.	SOLARAY	TE40C-80-2G	Indirect Forced Circulation	4/10/2001	1.1	35968	1922
SunEarth, Inc.	SOLARAY	TE48P-80-2G	Indirect Forced Circulation	4/10/2001	1.2	34722	1814
SunEarth, Inc.	SOLARAY	TE48C-80-2G	Indirect Forced Circulation	4/10/2001	1.2	32941	1814
SunEarth, Inc.	SOLARAY	TE64P-80-2G	Indirect Forced Circulation	4/10/2001	1.4	28489	1814
SunEarth, Inc.	SOLARAY	TE64C-80-2G	Indirect Forced Circulation	4/10/2001	1.6	24928	1814
SunEarth, Inc.	SOLARAY	TE48P-80-75G	Indirect Forced Circulation	7/21/2002	0.9	46044	1814
SunEarth, Inc.	SOLARAY	TE40P-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.0	42378	0
SunEarth, Inc.	SOLARAY	TE40C-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.1	40063	0
SunEarth, Inc.	SOLARAY	TE48P-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.1	39173	0
SunEarth, Inc.	SOLARAY	TE48C-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.2	36858	0
SunEarth, Inc.	SOLARAY	TE64P-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.4	30092	0
SunEarth, Inc.	SOLARAY	TE64C-80-2G-PV	Indirect Forced Circulation	4/10/2001	1.4	30092	0
SunEarth, Inc.	SOLARAY	TE63P-120-2G	Indirect Forced Circulation	9/11/2008	2.7	14078	1814
SunEarth, Inc.	SunSiphon	EPGX48-21-2G	Indirect Thermosyphon	5/20/2001	0.8	56267	0
SunEarth, Inc.	SunSiphon	EPGX48-24-2G	Indirect Thermosyphon	5/20/2001	0.8	55020	0
SunEarth, Inc.	SunSiphon	EPGX48-32-2G	Indirect Thermosyphon	5/20/2001	0.8	51281	0
SunEarth, Inc.	SunSiphon	EPGX80-40-2G	Indirect Thermosyphon	5/20/2001	0.9	48076	0
SunEarth, Inc.	SunSiphon	EPGX80-42-2G	Indirect Thermosyphon	5/20/2001	0.9	47186	0
SunEarth, Inc.	SunSiphon	EPGX80-48-2G	Indirect Thermosyphon	5/20/2001	1.0	45049	0
SunEarth, Inc.	SunSiphon	EPGX80-63-2G	Indirect Thermosyphon	5/20/2001	1.0	41488	0
SunEarth, Inc.	SunSiphon	EPGX80-64-2G	Indirect Thermosyphon	5/20/2001	1.1	40419	0
SunEarth, Inc.	SunSiphon	EPGX116-63-2G	Indirect Thermosyphon	5/20/2001	1.1	40954	0
SunEarth, Inc.	SunSiphon	EPGX116-64-2G	Indirect Thermosyphon	5/20/2001	1.1	40419	0

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH GAS AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
SunEarth, Inc.	SunSiphon	EPGX116-80-2G	Indirect Thermosyphon	5/20/2001	1.2	36502	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN2-GX100	Direct Integral Collector Storage	6/14/1999	1.1	41003	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-30-CN-G	Direct Integral Collector Storage	8/24/1998	0.9	49857	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-35-CN-G	Direct Integral Collector Storage	8/24/1998	0.9	49857	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN-G	Direct Integral Collector Storage	8/24/1998	1.0	44515	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-50-CN-G	Direct Integral Collector Storage	8/24/1998	1.0	44515	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN-GX	Direct Integral Collector Storage	9/15/1998	1.0	43446	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-50-CN-GX	Direct Integral Collector Storage	9/15/1998	1.0	43446	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN2-GX75	Direct Integral Collector Storage	1/15/1999	1.0	41675	0
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-30-CN-TL	Direct Integral Collector Storage	9/18/2008	1.2	34528	138
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-30-CN-TL	Direct Integral Collector Storage	9/18/2008	1.2	34528	138
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-20-CN-TL	Direct Integral Collector Storage	9/18/2008	1.0	43986	138
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-40-CN-TL	Direct Integral Collector Storage	9/18/2008	1.5	28934	138
Thermal Conversion Technology, Inc. (TCT Solar)	ProgressivTube®	PT-50-CN-TL	Direct Integral Collector Storage	9/18/2008	1.5	28738	138
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-112-2EP40FP-CNG/P	Indirect Forced Circulation	7/2/2001	1.2	33831	2650
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-199-3EP40FP-CNG/P	Indirect Forced Circulation	7/2/2001	1.3	29736	2650
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-199-4EP40FP-CNG/P	Indirect Forced Circulation	7/2/2001	1.7	22792	2340
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-299-5EP40FP-CNG/P	Indirect Forced Circulation	7/2/2001	2.1	17806	2340
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-299-6EP40FP-CNG/P	Indirect Forced Circulation	7/2/2001	2.4	16025	2340
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-52-1EP32FP-CNG/P	Indirect Forced Circulation	11/20/2001	0.8	48076	2959
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-52-1EP40FP-CNG/P	Indirect Forced Circulation	11/20/2001	0.9	44515	2959
TrendSetter Solar Products, Inc.	Six Rivers Solar	SRS-100-2-32-PC	Indirect Forced Circulation	3/7/2002	1.1	36502	2959
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-DB-72-1EP40FP-Elec	Indirect Forced Circulation	6/13/2005	1.6	23454	3097
TrendSetter Solar Products, Inc.	Six Rivers Solar	SRS-150-2-40-PC	Indirect Forced Circulation	6/13/2005	2.9	12387	2788
TrendSetter Solar Products, Inc.	Six Rivers Solar	SRS-150-3-32-PC	Indirect Forced Circulation	6/13/2005	3.9	8455	2788
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-100-1-30-PC	Indirect Forced Circulation	6/13/2005	1.2	32847	3097
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-150-2-22-PC	Indirect Forced Circulation	6/13/2005	1.5	26483	3097

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RATINGS SUMMARY OF OG-300 CERTIFIED SYSTEMS WITH GAS AUXILIARY

System Supplier	System Name	System Model Number	System Description	Cert Date	SEF	Q aux	Q par
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-200-3-30-PC	Indirect Forced Circulation	6/13/2005	4.8	5893	3097
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-200-4-30-PC	Indirect Forced Circulation	6/13/2005	16.5	0	2619
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-300-5-30-PC	Indirect Forced Circulation	6/13/2005	17.6	0	2463
TrendSetter Solar Products, Inc.	Six Rivers Solar	TS-300-6-30-PC	Indirect Forced Circulation	6/13/2005	20.1	0	2154
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 218 AUX GAS	Indirect Forced Circulation	11/10/2008	1.5	27421	2353
VELUX America Inc.	VELUX	CLI-U12 SKO W/L 318 AUX GAS	Indirect Forced Circulation	11/10/2008	2.3	16559	2353
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	1-200F-200V-G	Indirect Forced Circulation	1/13/2009	0.8	46295	6019
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	2-200F-300V-G	Indirect Forced Circulation	1/13/2009	1.1	33297	6096
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	3-200F-450V-G	Indirect Forced Circulation	1/13/2009	1.4	25641	6278
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	2-200F-300B-G	Indirect Forced Circulation		5.4	4801	3265
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	3-200F-450B-G	Indirect Forced Circulation		16.3	0	2659
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	2-200F-80R-G	Indirect Forced Circulation	1/13/2009	1.2	32585	2765
Viessmann Manufacturing Company (US) Inc.	Vitosol 200F Combi-Package	3-200F-120R-G	Indirect Forced Circulation	1/13/2009	1.5	25641	2765

*** OG300 Column Headings:**

SEF Solar Energy Factor:

$$SEF = \frac{Q_{DEL}}{Q_{AUX} + Q_{PAR}}$$

Where:

Q_{DEL} = Daily amount of energy delivered to the hot water load using the SRCC rating conditions, this value is 43,302 kJ/day. To convert to kWh, divide this value by 3,600.

Q_{AUX} = Daily amount of energy used by the auxiliary water heater or backup element, with the solar system operating (kJ/day). To convert to kWh, divide this value by 3,600.

Q_{PAR} = Parasitic energy: Daily amounts of AC electrical energy used to power pumps, controllers, shutters, trackers, or any other item needed to operate the SDHW system (kJ/day). To convert to kWh, divide this value by 3,600.

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