

ECOSUN®

SOLAR POOL HEATER



SOLTECH
ولتيلك

ADVANCED ENGINEERING SOLUTIONS
حلول هندسية بتكنولوجيا متقدمة

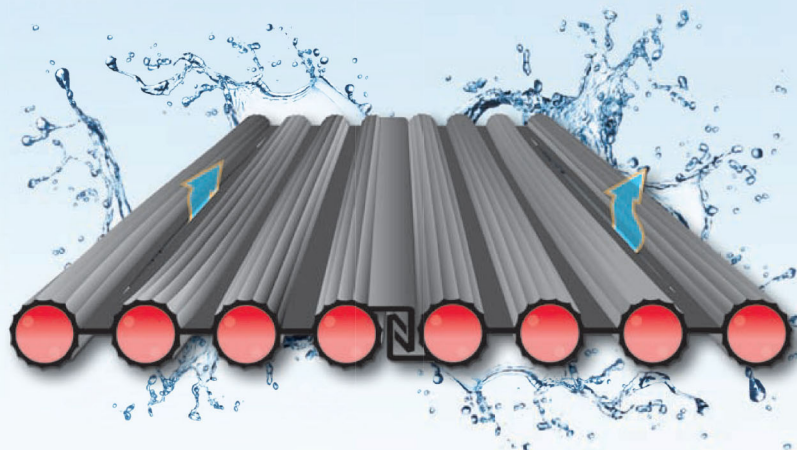
SWIM IN THE
WARMTH OF THE SUN!

Trust the Ecosun Solar Pool Heater

Since 1993, **tens-of-thousands of pool owners** around the world have experienced a longer and more comfortable swimming season, thanks to the Ecosun Solar Pool Heater.

Features & Benefits

- **Patented Vented Web** allows for roof moisture ventilation and wind-load relief.
- **Fluted Tubes** result in 10% more surface area, maximizing the sun's energy.
- **Expansion Joints** relieve stresses on the collector caused by thermal expansion and contraction.



When used in conjunction with our **stainless-steel Eagle Claw™ Mounting System**, Ecosun combines the strength and performance of a full-plate collector with the benefits of roof ventilation and reduced wind-load. You can rest-assured your Ecosun Solar Pool Heater will perform for years to come.

Technical Data



DIMENSIONS

	1.5" Series			2" Series		
Model Number	16104-12	16104-10	16104-8	16204-12	16204-10	16204-8
Nominal Size-ft.	4x12	4x10	4x8	4x12	4x10	4x8
Overall Collector Length-in	144.0	120.0	96.0	144.0	120.0	96.0
Collector Width-in	47.0	47.0	47.0	47.0	47.0	47.0
Manifold Length-in	50.5	50.5	50.5	50.5	50.5	50.5
Manifold O.D.-in	1.9	1.9	1.9	2.4	2.4	2.4
Manifold I.D.-in	1.5	1.5	1.5	2.0	2.0	2.0
Gross Collector Area-ft ²	47.3	39.3	31.4	47.3	39.3	31.4
Net Collector Area-ft ²	47.3	39.3	31.4	47.3	39.3	31.4

FLUID FLOW RATES

Model Number	16104-12	16104-10	16104-8	16204-12	16204-10	16204-8
Maximum-GPM	10.0	10.0	10.0	10.0	10.0	10.0
Minimum-GPM	3.0	2.5	2.5	3.0	2.5	2.5
Standard-GPM	5.0	4.0	3.25	5.0	4.0	3.25
Max. Collector with Single Feed @ Recommended Flow Rate	10	12	12	10	14	14

WEIGHTS

Dry-lbs	21.3	17.1	14.3	22.3	18.1	15.3
Wet lbs	48.0	41.6	35.1	54.0	47.6	41.1
Wet lbs-ft ²	1.0	1.0	1.1	1.1	1.2	1.3
Fluid Capacity-gal	3.2	2.9	2.5	3.8	3.5	3.1

NSF-50 LISTED

The Ecosun Solar Pool Heater meets or exceeds the strict safety, durability, and toxicity criteria of the National Sanitation Foundation's Standard 50 (NSF-50).

In most states, recreational aquatic equipment is required to meet the criteria of this standard, which verifies a product "is durable in design and construction, and is resistant to corrosion."

PRESSURES

Pressure Drop:	0.05 @ 2.5 gpm; 0.20 @ 5.0 gpm; 0.60 @ 10.0 gpm
Recommended Max. Operating Pressure	50 PSI @ 77° F
Max. Operating Pressure:	75 PSI @ 77° F; 35 PSI @ 140° F
Design Burst Pressure:	Greater than 100 PSI @ 140° F

THERMAL PERFORMANCE

Equation: $n = 0.9248 - 0.0512(u) - (4.76 + 1.998u)$

Rating: 1,104.44 Btus / ft² (certified by FSEC)

Tested and Certified in accordance with ISO 9806 and NSF/ANSI Standard 50; 2010



THE MOST TESTED. THE MOST TRUSTED.



ISO QUALITY MANAGEMENT

Aquatherm manufactures to ISO 9001 quality management standards, which includes a strong focus on continual improvement in all products & processes.



NSF / ANSI STANDARD 50

NSF/ANSI Standard 50 is a safety, durability, and toxicity standard required for commercial recreational aquatic equipment in most of the United States.



UNIFORM SOLAR ENERGY CODE

Model code developed by the International Association of Plumbing and Mechanical Officials® (IAPMO) to govern the installation and inspection of solar systems as a means of promoting the public's health, safety & welfare.

CERTIFIED THERMAL PERFORMANCE



IAPMO RESEARCH & TESTING

Products have been tested in accordance with ISO 9806 by an IAPMO R&T recognized laboratory to the applicable requirements of ISO/IEC 17025, and are in compliance with SRCC Standard 100-2014.



FLORIDA SOLAR ENERGY CENTER

Products have been evaluated in accordance with prescribed methods by FSEC and found in compliance with quality and design standards for solar thermal collectors and systems for performance.





REGISTRATION CERTIFICATE

This document certifies that the administration systems of

Aquatherm Industries, Inc.

1940 Rutgers University Boulevard, Lakewood, NJ 08701, USA

***have been assessed and approved by QAS International
to the following management systems, standards and guidelines:***

ISO 9001:2015

The approved administration systems apply to the following:

***Aquatherm Industries, Inc., located in Lakewood, New Jersey, is a Global Manufacturer
of Low and Intermediate Temperature Polymer Solar Thermal Heating Systems, and a
Supplier of other cost-effective Water Heating Technologies that minimize
environmental impact, for Residential and Commercial Swimming Pools and Spas.***

Original Approval 25th July 2011

Current Certificate 25th July 2019

Certificate Expiry 25th July 2020

Certificate Number US3336

Signed: Certification Officer

On behalf of QAS International

This certificate remains valid while the holder maintains their administration systems in accordance with the standards and guidelines stated above, which will be audited annually by QAS International. The holder is entitled to display the above registration mark for the duration of this certificate, which should be returned to QAS International upon reasonable request.

Issuing Office: QAS International, 5 Technology Park, Colindeep Lane, London, NW9 6BX, UK



**CERTIFIED SOLAR THERMAL COLLECTOR**

SUPPLIER:
Aquatherm Industries, Inc.
1940 Rutgers University Blvd.
Lakewood, NJ 08701 USA
www.warmwater.com

MODEL: Ecosun 16104-10
THERMAL COLLECTOR TYPE: Unglazed Flat Plate
CERTIFICATION #: 00630
Original Certification: January 08, 2014
Expiration Date: September 23, 2033

This solar collector was evaluated by the Florida Solar Energy Center (FSEC) in accordance with prescribed methods and was found to meet the minimum standards established by FSEC. This evaluation was based on solar collector tests performed by an FSEC approved laboratory. The purpose of the tests is to verify initial performance conditions and quality of construction only. The resulting certification is not a guarantee of long term performance or durability. This collector has been rated for energy output on measured performance and an assumed standard day. Total solar energy available for the standard day is 5045 Watt-hour/m² (1600 Btu/ft²) distributed over a 10 hour period.

COLLECTOR THERMAL PERFORMANCE RATING (Collector Tested per ASHRAE 96)

Kilowatt-hours (thermal) Per m ² Per Day				Thousands of Btu Per ft ² Per Day			
Category Inlet	Low 30°C	Intermediate 50°C	High 100°C	Category Inlet	Low 86°F	Intermediate 122°F	High 212°F
ENERGY OUTPUT	3.5	1.2	0.0	ENERGY OUTPUT	1.1	0.4	0.0

COLLECTOR SPECIFICATIONS

Gross Area:	3.642 m ²	39.20 ft ²	Dry Weight:	8 kg	17 lb
Net Aperture Area:	3.642 m ²	39.20 ft ²	Fluid Capacity:	11.0 liter	2.9 gal
Absorber Area:	3.642 m ²	39.20 ft ²	Test Pressure:	241 kPa	35 psi

TECHNICAL INFORMATION

Tested in accordance with: ASHRAE 96

Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta]

SI UNITS:	Wind speed (u) < 1.5 m/s, Temperature (Ti - Ta) in °C, Radiation (G) in W/m ² $\eta = 0.935 - 8.930(P/G) - 0.647(P^2/G)$
IP UNITS:	Wind speed (u) < 3 mph, Temperature (Ti - Ta) in °F, Radiation (G) in Btu/hr-ft ² $\eta = 0.935 - 1.574(P/G) - 0.063(P^2/G)$

IAM Coefficient:	1 - 0.13	
Test Fluid:	Water	
Test Mass Flow Rate:	kg/(s m²)	lb/(hr ft²)

REMARKS:

Joseph Walters
Technical Director

Print Date: August, 2019
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FSEC/UCF ♦ 1679 Clearlake Road ♦ Cocoa, Florida 32922 ♦ (321) 638-1426 ♦ Fax (321) 638-1010 ♦ www.fsec.ucf.edu





IAPMO RESEARCH AND TESTING, INC.

Solar Collector Rating Sheet

Listee:

AQUATHERM INDUSTRIES, INC.
1940 RUTGERS UNIVERSITY BLVD.
LAKEWOOD, NJ 08701-4537

File No: S-3051**Collector Name:** Ecosun**Brand Name:** Ecosun**Collector Type:** Unglazed Flat Plate**Model Number:** 16104-10**COLLECTOR SPECIFICATIONS (for the tested collector)**

Gross Area:	3.65 m ²	39.29 ft ²	Gross Length:	3.00 m	9.84 ft
Aperture Area:	3.65 m ²	39.29 ft ²	Gross Width:	1.19 m	3.90 ft
Absorber Area:	3.65 m ²	39.29 ft ²	Gross Depth:	0.05 m	0.16 ft
Fluid Capacity:	11.54 liters	3.05 gallons	Test Pressure:	241.40 kPa	35.00 psi
Dry Weight:	7 kg	15.40 lb			

TECHNICAL INFORMATION

ISO Efficiency Equation [NOTE: Based on gross area and (P)=Ti-Ta]		Tested in accordance with: ISO 9806		
SI Units:	$\eta = 0.9248(1 - 0.05536u) - (15.007 + 6.298u)(t_{in} - t_a)/G''$	Y-Intercept: 0.9183	Slope: 19.518	W/m ² .°C

COLLECTOR THERMAL PERFORMANCE RATING

Kilowatt-hours Per Collector Per Day				Thousands of BTU Per Collector Per Day			
CATEGORY (Ti-Ta)	CLEAR DAY (6.3 kWh/m ² .day)	MILDLY CLOUDY (4.7 kWh/m ² .day)	CLOUDY DAY (3.1 kWh/m ² .day)	CATEGORY (Ti-Ta)	CLEAR DAY (2000 Btu/ft ² .day)	MILDLY CLOUDY (1500 Btu/ft ² .day)	CLOUDY DAY (1000 Btu/ft ² .day)
A (-5 degC)	20.700	16.100	11.400	A (-9 degF)	70.631	54.936	38.898
B (5 degC)	11.900	7.400	3.200	B (9 degF)	40.605	25.250	10.919
C (20 degC)	2.900	0.200	0.000	C (36 degF)	9.895	0.682	0.000
D (50 degC)	0.000	0.000	0.000	D (90 degF)	0.000	0.000	0.000
E (80 degC)	0.000	0.000	0.000	E (144 degF)	0.000	0.000	0.000
A -Pool Heating (Warm Climate) B -Pool Heating (Cool Climate) C -Water Heating (Warm Climate) D -Water Heating (Cool Climate) E -Air Conditioning							
Kilowatt-hours Per m ² Per Day				Thousands of BTU Per ft ² Per Day			
CATEGORY (Ti-Ta)	CLEAR DAY (6.3 kWh/m ² .day)	MILDLY CLOUDY (4.7 kWh/m ² .day)	CLOUDY DAY (3.1 kWh/m ² .day)	CATEGORY (Ti-Ta)	CLEAR DAY (2000 Btu/ft ² .day)	MILDLY CLOUDY (1500 Btu/ft ² .day)	CLOUDY DAY (1000 Btu/ft ² .day)
A (-5 degC)	5.671	4.411	3.123	A (-9 degF)	1.798	1.399	0.990
B (5 degC)	3.260	2.027	0.877	B (9 degF)	1.034	0.643	0.278
C (20 degC)	0.795	0.055	0.000	C (36 degF)	0.252	0.017	0.000
D (50 degC)	0.000	0.000	0.000	D (90 degF)	0.000	0.000	0.000
E (80 degC)	0.000	0.000	0.000	E (144 degF)	0.000	0.000	0.000
A -Pool Heating (Warm Climate) B -Pool Heating (Cool Climate) C -Water Heating (Warm Climate) D -Water Heating (Cool Climate) E -Air Conditioning							

Incident Angle Modifier[(S)=1/cosθ - 1, 0 degree < θ <= 60 degree]

θ	10	20	30	40	50	60	70
KTa	0.998	0.992	0.98	0.961	0.929	0.872	0.753
Test Fluid:	Water		Test Mass Flow Rate:		0.0762 kg/(s.m ²)	56.194 lb/(hr.ft ²)	

**NSF / ANSI Standard 050 - Equipment for Swimming Pools, Spas, Hot Tubs and Other
Recreational Water Facilities**

Authorized Registered Formulation

Customer Name: Aquatherm Industries, Inc.	Facility Location: Lakewood, NJ
Customer Number: C0052262	Facility At: Lakewood, United States
	Facility Number: C0052263

Trade Name	Function	Size
Solar Collectors	Heat Exchanger	

Category
HHE, Recreational Water- Heaters and Heat Exchangers

Temperature
Spa (104 F/40 C) and Swimming Pool (75 F/24C)

Listing Notes

Trade Designation	Size	Maximum Flow Rate (gpm) [2]
1.5" Solar Collectors[1]		
Ecolite 17043-10	2' x 10' x 1.5"	2.0
Ecolite 17043-12	2' x 12' x 1.5"	2.5
Ecolite 17043-8	2' x 8' x 1.5"	1.63
Ecosun 16104-08	4' x 8' x 1.5"	3.25
Ecosun 16104-10	4' x 10' x 1.5"	4.0
Ecosun 16104-12	4' x 12' x 1.5"	5.0
SI 10001-1	4' x 8' x 1.5"	3.25
SI 10001-2	4' x 10' x 1.5"	4.0
SI 10001-5	4' x 12' x 1.5"	5.0
Sun-Swim 16004-08	4' x 8' x 1.5"	3.25
Sun-Swim 16004-10	4' x 10' x 1.5"	4.0
Sun-Swim 16004-12	4' x 12' x 1.5"	5.0
Sun-SwimPlus16069-08	4' x 8' x 1.5"	3.25
Sun-SwimPlus16069-10	4' x 10' x 1.5"	4.0
Sun-SwimPlus16069-12	4' x 12' x 1.5"	5.0
Sunlite 17039-10	2' x 10' x 1.5"	2.0
Sunlite 17039-12	2' x 12' x 1.5"	2.5
Sunlite 17039-8	2' x 8' x 1.5"	1.63
UltraSwim 16045-08	4' x 8' x 1.5"	3.25
UltraSwim 16045-10	4' x 10' x 1.5"	4.0
UltraSwim 16045-12	4' x 12' x 1.5"	5.0

[1] Follow manufacturer's instructions for the installation and operation of this equipment. Any modifications, other than those recommended by the manufacturer, will void the NSF Certification. NSF Certified to NSF/ANSI Standard 50 for material health safety, product marking, installation and use instructions, dimensional compliance, burst testing at 73°F, 20,000 pressure cycle testing, burst testing at 140°F, and pressure loss testing.

[2] The maximum flow rate is 10 gpm. The values indicated are the recommended flow rate by manufacturer.

Trade Designation	Size	Maximum Flow Rate (gpm) [2]
2" Solar Collectors[1]		
Ecosun 16204-08	4' x 8' x 2"	3.25
Ecosun 16204-10	4' x 10' x 2"	4.0
Ecosun 16204-12	4' x 12' x 2"	5.0
SI 10204-08	4' x 8' x 2"	3.25
SI 10204-10	4' x 10' x 2"	4.0
SI 10204-12	4' x 12' x 2"	5.0
SI Fusion 10304-08	4' x 8' x 2"	3.25
SI Fusion 10304-10	4' x 10' x 2"	4.0
SI Fusion 10304-12	4' x 12' x 2"	5.0
Sun-Swim 16304-08	4' x 8' x 2"	3.25
Sun-Swim 16304-10	4' x 10' x 2"	4.0
Sun-SwimPlus16070-12	4' x 12' x 2"	5.0
UltraSwim 16050-08	4' x 8' x 2"	3.25
UltraSwim 16050-10	4' x 10' x 2"	4.0
UltraSwim 16050-12	4' x 12' x 2"	5.0
Ultrasun 16404-08	4' x 8' x 2"	3.25
Ultrasun 16404-10	4' x 10' x 2"	4.0
Ultrasun 16404-12	4' x 12' x 2"	5.0

[1] Follow manufacturer's instructions for the installation and operation of this equipment. Any modifications, other than those recommended by the manufacturer, will void the NSF Certification. NSF Certified to NSF/ANSI Standard 50 for material health safety, product marking, installation and use instructions, dimensional compliance, burst testing at 73°F, 20,000 pressure cycle testing, burst testing at 140°F, and pressure loss testing.

[2] The maximum flow rate is 10 gpm. The values indicated are the recommended flow rate by manufacturer.

Trade Designation	Size	Maximum Flow Rate (gpm) [2]
3.8 cm Solar Collectors[1]		
Ecolite 17043-3[3]	2'x9.84'x3.8cm	1.98
Ecolite 17043-4[4]	2'x 13.12'x3.8cm	2.5
Sunlite 17032-3[3]	2'x9.84'x3.8cm	1.98
Sunlite 17032-4 [4]	2'x13.12'x3.8cm	2.5

[1] Follow manufacturer's instructions for the installation and operation of this equipment.
Any modifications, other than those recommended by the manufacturer, will void the NSF Certification. NSF Certified to NSF/ANSI Standard 50 for material health safety, product marking, installation and use instructions, dimensional compliance, burst testing at 73°F, 20,000 pressure cycle testing, burst testing at 140°F, and pressure loss testing.

[2] The maximum flow rate is 10 gpm. The values indicated are the recommended flow rate by manufacturer.

[3]Recommended flow rate: 7.5 LPM.

[4]Recommended flow rate: 9.5 LPM.

