

# SOLAR THERMAL AQUATICS

# Introducing...



## About Ecosun Australia

Ecosun Australia Pty Ltd ABN 45 137 919 558 is an Australian owned company specialising in solar thermal pool heating. We are proud and long standing members of SPASA and the Master Builders Association.

Ecosun Australia is dedicated to providing quality construction, technical and advisory services to our clientele. We strive to implement a long term relationship with our clients, based on safety, quality, timely service and an anticipation of their needs. We measure success by exceeding these criteria.

Ecosun Australia was founded in 2001 with the intention of providing superior pool heating solutions for residential & commercial facilities. At this time the local pool heating market was dominated by extruded strip collector systems which had proven their effectiveness since the 1970's. This trend was unique to Australia and New Zealand - European and American markets were dominated by pre-formed unglazed polymeric panel collectors.

Our Directors, with a combined 62 years experience focused their efforts on adapting and fine tuning of these 'new' systems to suit local conditions. Based on this research, and the expected service life of a polypropylene collector panel we pioneered the Cockatoo/Vermin warranty.

In 2009, Dave Sizelove, President & CEO of Aquatherm Industries Inc. had noticed our efforts and approached us with the intention of securing an Australian dealership by means of joint venture. Aquatherms' vision is congruent with our own: not to be the biggest, but the best at what we do. More than 3000 systems have been installed in Australian homes and aquatic facilities by ourselves and our network of selected dealers. All Ecosun collectors are covered by a genuine 35 year *manufacturer* warranty. Ecosun warranty claims over the last 20 years have averaged less than 1%.



*Paul Farry (Ecosun Australia) and Dave Sizelove (Aquatherm) inspect the latest production run at the 50,000ft<sup>2</sup> New Jersey production facility*



*5.4m Ecosun panels at Maroubra Seals Club*



# Technical standard for



## **Solar Collector Panel** (Aquatherm Industries ECOSUN)

Solar collector shall be virgin grade polypropylene, extruded from pre-compounded (antioxidants, carbon-black) resin formulated for extended exposure (35 year warranty). Solar collector array(s) shall be configured for optimum coverage of available roof/ground space with primary focus on hydraulic efficiency.

Solar collectors shall be manufactured within an ISO 9001:2008 accredited facility. Solar collectors shall be certified to NSF/ANSI- 50-2011: *Equipment for Swimming Pools, Spas, Hot Tubs and other recreational Water Facilities*.

Solar collector plate- to- manifold connection shall be a continuous (one piece) thermal weld. Manifold diameter shall be 50mm. Plate construction shall be of 'tube & web' construction with ventilation to increase surface area and reduce wind load. Individual collectors shall be clearly labelled with Manufacturers title, city and state, date of manufacture, individual serial number and approvals/certifications. The weight of the collector when filled with water shall be no more than 6.2 kilograms per square metre of frontal area. The collectors shall be capable of withstanding an internal static pressure of 5.8 BAR at operating temperature and shall be resistant to corrosion, freezing, internal scale accumulation and be warranted against cockatoo/vermin attacks (10 year warranty)

Collector mounting shall consist of 18-8 chromium-nickel stainless steel mounting hardware with continuous transverse stainless steel straps having black polypropylene coating. Transverse straps shall be fastened with 18-8 chromium-nickel stainless steel clamps and brackets. In areas prone to *extreme* winds, Aquatherm Hurricane Clamps in 18-8 chromium-nickel stainless steel shall be fitted in addition to the aforementioned hardware. Water connections shall be made with hose sections extruded from EPDM (ethylene-propylene-diene-terpolymer) 70 durometer minimum hardness. Hose clamps shall be black powder coated all stainless worm gear type with 18-8 chromium-nickel stainless steel band.

Collectors shall be capable of thermal performances of at least 85% efficiency when inlet fluid temperature equals ambient temperature and be capable of collecting solar energy when the inlet fluid temperature exceeds the ambient temperature by 16°C with 250 BTU per square foot per hour.

Pressure head loss of a single collector must not exceed 9.1cm of H<sup>2</sup>O at recommended flow rate.

The collectors shall meet or exceed the minimum standards established by the Florida Solar Energy Center, National Sanitation Foundation, other applicable internationally recognized standards and shall be manufactured in the U.S.A.

# Technical standard for



## **Pipework**

Standards: **AS1477 AS2032 BS10** Schedule 80

All above ground pipework shall be class 9 uPVC pressure pipe for diameters up to 80mm and class 6 for diameters equal to or greater than 100mm. Fittings and joints shall be solvent cement welded to ASA-185. Underground pipework shall be class 12 minimum. All pipework shall be adequately supported and fixed, all supports to be straight and true. Bracket and pipe supports shall provide adequate vertical & lateral restraint allowing for thermal expansion without placing any strain on plant and equipment. Flanged fittings shall be fitted and torqued to BS10

A circulating pump shall be used to provide water circulation through the solar collector. This shall take water from the pool filtration line or balance tank, pass it through the solar collector and thence back into the filtration line or balance tank. Pump construction shall be:

End suction, back pull-out, close coupled pedestal, single stage centrifugal with combined strainer. Operating pressure as required, but with a minimum shut-off head approximately 50kPa greater than operating pressure. duty shall be based on a flowrate of 4 lpm/m<sup>2</sup> applied to the solar collector area or that which is specified.

## **Isolating Valves**

Standards: **BS5155 AS2528**

Isolating valves shall be short pattern, butterfly type. Wrench operated, notched plate for fixing position. PVC body and blade, EPDM seals, 316L grade stainless steel shaft.

## **Non-return valves**

Wafer type with cast iron body and stainless steel flaps or uPVC body with PTFE diaphragm (<80mm pipe diameter)

## **Automatic Controller – temperature differential**

A temperature differential automatic controller shall be used to control the operation of the solar circulatory pump, triggered by prevailing atmospheric conditions. The Controller shall be configurable to interlock with other heating systems. The Controller shall have an over-temperature cut-out at 40° Celsius. Differentials shall be configurable, the unit displays, in celsius:

Current pool temperature, current roof temperature and last recorded solar gain

# Technical standard for



## Dimensions - standard production

Model Number	<u>16104-12</u>	<u>16104-10</u>	<u>16104-8</u>
Nominal size (mm)	1220 x 3660	1220 x 3050	1220 x 2440
Overall Collector Length (mm)	3660	3050	2440
Collector Width (mm)	1190	1190	1190
Manifold Length (mm)	1280	1280	1280
Manifold OD (mm)	48	48	48
Manifold ID (mm)	38	38	38
Gross Collector area (m <sup>2</sup> )	4.47	3.72	2.98
Net Collector area (m <sup>2</sup> )	4.47	3.72	2.98

## Weights

Dry -(kg)	9.66	7.76	6.49
Wet - (kg)	21.77	18.87	15.92
Wet (kg/m <sup>2</sup> )	5.0	5.0	5.0
Fluid Capacity (L)	12.11	11.11	9.43

## Fluid Flow Rates

Maximum (lpm)	37.9	37.9	37.9
Minimum (lpm)	11.4	9.5	9.5
Recommended (lpm)	18.9	15.1	12.5
Max Collector with single feed @ recommended flow rate	10	12	12

## Pressures

Pressure Drop	9.1cm/H <sup>2</sup> O pressure loss at recommended flow rate 6.1cm/H <sup>2</sup> O pressure loss at minimum flow rate
Max Fluid Pressure	Greater than 5.8BAR @30°C
Recommended Max. Operating Pressure	2.4BAR @ 60°C

# Technical standard for



## Bespoke Manufacturing

*Due to the unique multi-plate construction of Ecosun collectors, they can be manufactured to bespoke lengths and widths, giving Architects, Engineers & Designers much greater flexibility and a simpler, more economical solution for the client. More thermal output for less outlay and an accelerated ROI. Please note: 6 weeks notice required for manufacture & shipping.*

Half-width collectors	Nominal Size (mm)	Overall Length (mm)	Manifold Length (mm)	Collector area (m2)
16102-08	590 x 2440	2440	678	1.44
16102-10	590 x 3050	3050	678	1.80
16102-12	590 x 3660	3660	678	2.16
16102-14	590 x 4267	4267	678	2.52
16102-16	590 x 4877	4877	678	2.88
16102-18	590 x 5486	5486	678	3.24
16102-20	590 x 6096	6096	678	3.60

## Full-width collectors

16104-06	1220 x 1829	1829	1280	2.23
16104-14	1220 x 4267	4267	1280	5.20
16104-16	1220 x 4877	4877	1280	5.95
16104-18	1220 x 5486	5486	1280	6.70
16104-20	1220 x 6096	6096	1280	7.44



Extruded collector plates of differing lengths, made to order



Aquatherm employees assemble the plates/manifolds to a finished product

# Warranties



## **Warranty claims must be made to Ecosun Australia accompanied with proof of purchase.**

Ecosun Australia warrant that Aquatherm Industries Ecosun solar collectors are guaranteed to perform to the specification outlined in this publication when used exclusively for their intended application: heating of swimming pools & spas. No other function or purpose applies.

### **ECOSUN Pool Heating Collectors 35-Year Commercial Collector Warranty**

This warranty is issued by Ecosun Australia Pty Ltd ABN 45 137 919 558 and Aquatherm Industries inc and applies to all Ecosun solar pool-heating collectors distributed by Ecosun Australia Pty Ltd and installed in Australia on or after 1st October 2009 for the purpose of heating swimming pools and spas.

#### **35-Year Warranty**

Ecosun Australia Pty Ltd and Aquatherm USA warrant to the original purchaser that the collectors will be free from defects in materials and workmanship in the manufacturing process under normal use for a period of 35-years from the date of initial installation when installed using Aquatherms' recommended methods.

Part A. If, during the initial 12-year period, a collector, or any of the collector's associated fittings, shows a manufacturing defect; either the necessary parts to rectify the fault, or a new collector, will be supplied at no cost to the purchaser. The decision as to which course of action to be taken will be at the sole discretion of Ecosun Australia Pty Ltd who are under no obligation to comply with any commitments made by any dealer or installer.

Part B. Following the expiration of the 12-year warranty period in Part A above, if during the next 23-year period, a collector shows a manufacturing defect; a new collector will be supplied to the purchaser at one half of the then current retail price.

#### **Cockatoo Coverage**

During the first 5-years of this First Period, Ecosun Australia shall be required to exchange a defective collector due to any direct damage cause by the Cockatoo. For the next 5-years Ecosun Australia will provide the customer a replacement collector at one half of the then current retail price for any direct damage caused by the Cockatoo.

#### **Transferability of Warranty**

This Warranty is solely for the benefit of the original customer and with respect to the original installation only and is therefore not transferable. If at any time, a collector is resold, moved, reinstalled, or has changed ownership; this warranty will be void. The new owner has the option to apply directly with Ecosun Australia for a Transferability Addendum to this warranty. This application must be turned in to Ecosun Australia within 90 days of the change in original ownership. We reserve the right to refuse any application.

**Note: Any labour, travel and freight costs incurred are excluded from this warranty. These costs are to be paid for by the owner. However, if a collector needs replacing within one year from the date of original installation, Ecosun Australia Pty Ltd will replace the collector free of charge. For the next 4 years, Ecosun Australia, may, after negotiation, reimburse fair and reasonable costs.**

#### **Exceptions**

Neither Ecosun Australia Pty Ltd, Aquatherm Industries inc, their Directors, Staff, Distributors nor Dealers shall be liable for incidental or consequential damage arising from any fault with any Aquatherm components. This warranty will also not apply if the failure of any component is due to damage, misuse, neglect, abnormal weather conditions, failure to isolate the solar circuit prior to backwash/scheduled and/or unscheduled hydraulic system(s) maintenance, act of God or improper installation.



# The Ecosun Solar Pool Heating System

## Innovative Design. High Performance.

Using clean, renewable solar power for **in-ground and above ground pool heating** enables you to extend your swim season, make the most of your investment in a pool, and increase the value of your home efficiently, cost-effectively, and with minimal environmental impact!

**Solar swimming pool heaters** operating costs are negligible, since energy from the sun is FREE. Solar powered pool heaters are also 100% eco-friendly. And because a solar system has few moving parts, it is virtually maintenance-free. All you need to do is set the temperature, and enjoy warm water for many more months out of the year without worrying about your energy bill, or damage to the environment.

In comparing solar pool heaters, you'll discover that the **Ecosun Solar Pool Heating Collector** is the most advanced swimming pool solar heater on the market today. Two unique characteristics set it apart from other solar pool heaters: the [patented vented web](#) and fluted surface design.



- The **vented web** allows for moisture ventilation for the roof as well as wind load relief during adverse weather conditions, making the entire system more resilient.
- The **fluted surface** design, which has received one of the highest performance ratings ever recorded, provides over 10% more collector area.
- **Multi-plate construction** ensures each and every Ecosun collector can handle thermal expansion/contraction and torsional stresses without deformation
- **Dual durometer EPDM hose couplers** are designed and manufactured in house for the application. No annual tightening required like laminated radiator hose sections, No 'O' rings or barrel unions
- **Compounded resin.** Antioxidants and carbon black are added to the resin by the supplier, not at the production facility. Even distribution ensures no fading or degradation of the collector over time.

Aquatherm's efficient solar pool heaters, which can stand alone or are easily configured into [hybrid](#) systems, are currently operating throughout the U.S. and in dozens of countries worldwide. Innovative design and uncompromising quality control have made Ecosun by Aquatherm the solar swimming pool heater of choice among discerning facility management & operators.



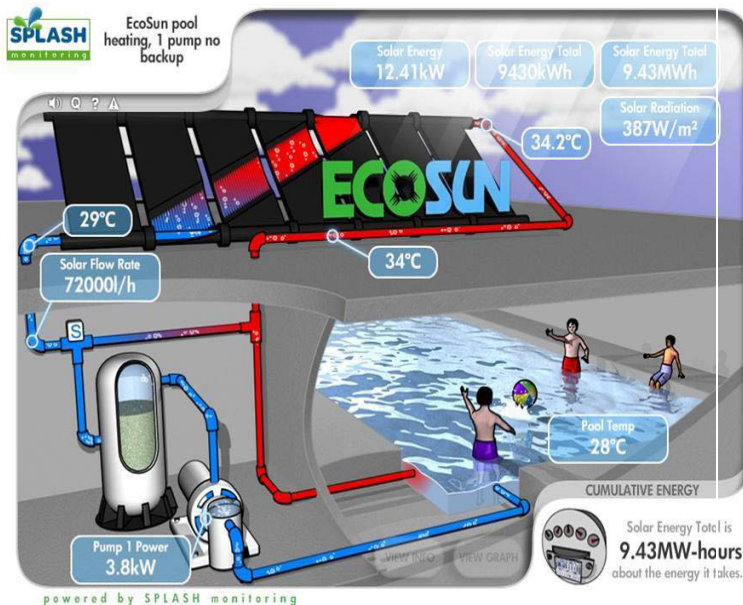
## ECOSUN Collectors & SPLASH Monitoring

ECOSUN collectors are manufactured under one roof from “pellets to pallets” by Aquatherm Industries, the largest manufacturer of solar pool heating collectors in the United States. The ECOSUN collectors are manufactured under a strict ISO accredited manufacturing and quality control system which includes each collector being fully tested before leaving the factory, this ensures the collectors provide years of trouble free operation. Aquatherm solar collectors have been subjected to DSET Labs [EMMAQUA](#) accelerated 23 year exposure test in the Arizona desert.

The ECOSUN collector is the world’s first hybrid solar pool heating collector and a product of over thirty years of manufacturing experience. ECOSUN collectors have proven themselves in tens of thousands of installations around the world. When you choose ECOSUN, you are choosing solar technology with a proven history of reliability and performance.

Aquatherm industries is the first and ONLY Solar pool heater manufacturer to be awarded the National Sanitation Foundation’s [NSF-50](#) – a safety and durability standard for commercial swimming pools, ensuring your patrons can swim safely in the knowledge the world’s leading testing authority has approved the ECOSUN pool system. Why would you use anything else?

## ECOSUN Solar Swimming Pool Installations



- ✓ Select your desired pool temperature on the automated controller.
- ✓ The controller automatically turns on a pump to circulate water through the collectors.
- ✓ As the water flows through the collectors it’s heated by the FREE energy from the sun and returned to heat your pool.
- ✓ ECOSUN solar collectors can either be installed as the only heat source for heating a pool or work seamlessly with a backup gas boiler or heat pump heating system.
- ✓ ECOSUN collectors are suitable for heating both indoor and outdoor pools

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## Evolution of the Solar Collector Design

With its patented vented web and unique fluted tube surface, the ECOSUN collector has evolved from lessons learned in over 30 years of collector design and manufacturing, resulting in the most advanced solar pool heating collector available today. The vented web allows for moisture ventilation for the roof and results in reduced wind loads, whilst the fluted design provides an additional 10% more collector area and results in one of the highest performing collectors ever tested. Choose ECOSUN collectors, the only ones to have implemented the lessons learnt in this evolution of pool heating.

# Evolution of Solar Pool Heating

## 1970s - Square Tube-on-Tube

- Earliest effort at polymer solar pool heating system.
- Thicker tube-walls result in low efficiency.
- Tube separations due to expansion & contraction.



## 1980s - Round Tube-on-Tube

- Round tubes & thinner walls meant higher efficiencies.
- Buckling & weakening due to expansion & contraction.



## 1990s - Loose Tube

- Separate tubes eliminate stress from expansion & contraction.
- Spaces trap leaves and debris between collectors & roof, also results in decreased performance from wind.



## Today - Tube-and-Web

- Designed to handle extreme expansion & contraction while providing maximum solar collector surface area.
- Vents are often incorporated to combine wind-load relief benefits of loose tube collector with the surface area of a full plate.



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## ECOSUN – The Most Tested.....The Most Trusted

 <p>National Sanitation Foundation</p>  	<p>Aquatherm are the first and only solar pool heating manufacturer to be awarded the National Sanitation Foundation's NSF-50 – A safety, durability &amp; toxicity standard for commercial swimming pools.</p> <ul style="list-style-type: none"> <li>✓ Means they are SAFE for commercial pools</li> <li>✓ Ensures peace of mind, for years of safe swimming</li> <li>✓ Best practice construction</li> <li>✓ Will not leach harmful materials into the pool</li> <li>✓ Resistant to corrosion and scaling</li> <li>✓ Pool owners and their staff can rest assured that the solar system and the water they swim in are safe</li> </ul>
	<ul style="list-style-type: none"> <li>✓ The materials used in the ECOSUN collectors are tested to the highest ISO standards to ensure years of trouble-free service.</li> <li>✓ The collectors are manufactured under one roof, from pellets to pallets with an ISO accredited control and manufacturing system, ensuring the best quality control to deliver to you the Best Practice and most robust systems.</li> </ul> 
<p>Also tested / Accredited by</p> <div style="display: flex; justify-content: space-around; align-items: center;">     </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;">   </div>	
	<p>The proof is in the pellets - in manufacturing ECOSUN collectors, Aquatherm use only compounded resin in their collectors. This ensures an even distribution of anti-oxidants, like carbon-black that protect the collectors from fading.</p>

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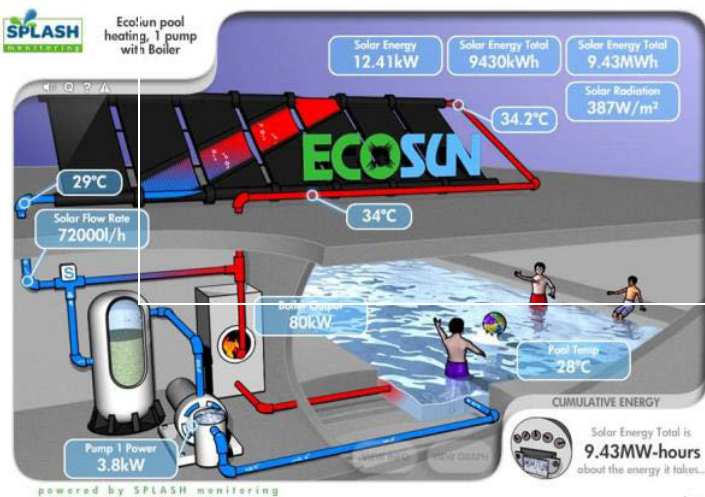


**We stand by our systems – Choose our SPLASH Monitoring system to guarantee the operation and performance of your swimming pool heating system.**

The operation of the solar water heating system can be monitored by SPLASH Monitoring to ensure your system operates as intended and will provide notifications and alerts if an error occurs or, if the system performance can be improved.

**If you are a school or public facility, utilise SPLASH Monitoring as an educational or marketing tool. It is unique and has been developed by our partner Energy Conscious Design in New Zealand.**

SPLASH Monitoring provides an animated visual representation of the solar water heating system with realtime information. SPLASH Monitoring is an effective commissioning tool for use by installers as well as allowing clients to monitor their own installations. It allows remote monitoring, logging, diagnostics and support, with automated alerts.



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The realtime information displayed depends upon the sensors installed and can be customised to suit each installation, requirements and the expected audience. SPLASH Monitoring is suitable for large, complex, commercial and industrial, as well as domestic scale installations. Realtime information can include;

- Pool and system temperatures
- System operation
- Solar radiation, this also controls the extent of cloud cover displayed, great for children and education
- Instantaneous heat from solar system
- Heat input by backup heating and or electric elements
- System efficiency
- Cumulative heat recovered since zeroed, this is shown as kWhrs, as well as days of average house consumption, cups of tea and slices of toast, again great for children and education

SPLASH Monitoring also provides extensive data logging using graphs. This allows installers and customers to ensure correct system operation, determine the system performance and also provides an effective tool for commissioning, monitoring and providing reporting of a system's performance.

SPLASH Monitoring includes automated notification and reporting, providing alerts if the system fails or under-performs and annual reporting, which is customisable to suit the clients' requirements.

If you have any questions or require further information please contact us.

Sincerely,

Wells Gilbert  
Manager, Strata & Commercial

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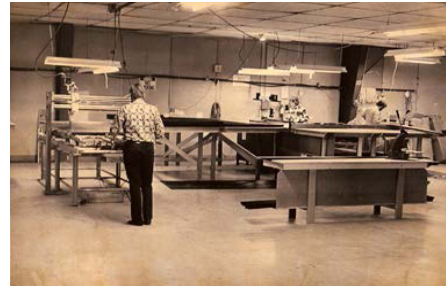


### From Humble Beginnings...

About thirty years ago a small group of engineers had a thought – someday, heating a pool with a conventional fossil-fuel heater will become a luxury we can no longer afford. But, as most pool owners will tell you, an unheated pool is an unused pool.

The group began work on what would become the Solar Industries Solar Pool Heating System – a long lasting, cost-effective polypropylene solar heater for swimming pools.

With its unique design, the SI Collector received the first patent ever awarded for a sun-tracking “Tube-and-Web” polypropylene solar collector. Modern Plastics Magazine heralded the design and manufacturing process as a “new concept” in the use of polypropylene for such an application.



*Solar Industries production line circa 1976*



**Today, Aquatherm Industries manufactures six of the most trusted brands of collectors in the solar pool heating industry.**

All material is processed and assembled under one roof at our 50,000 square-foot facility in Lakewood, NJ. This “pellets to pallets,” vertically integrated approach gives us total quality control, and assures collectors and components of the highest quality.



Our success has been built around the strength of our international network of Dealers and Distributors. Our solar heating systems can be found on over 500,000 pools around the world, helping pool owners to maximize their season – as well as their investment in a swimming pool.

### A Message from Dave Sizelove President & CEO, Aquatherm Industries

Thank you for visiting with us. If this is your first contact with Aquatherm, I'd like to personally extend a warm welcome to you. We hope you will join our family of satisfied customers, who currently number over 500,000 residential and commercial pool owners around the world. We are proud to be the first and for commercial pools - a durability and toxicity standard that assures pool owners and their patrons that their solar pool heater and the water they swim in is safe.

Although solar pool heating is not as well known as more exotic uses of solar energy, such as photovoltaic cells or large turbine systems, heating pools with solar energy remains the most cost-effective use of solar thermal in the world, as well as its largest.

