

## Testing High-Efficiency Pool Heating Systems

# Case Study

### Background

The details of this field study are based on the William Woollett Aquatic Center, located in Irvine, California.



### The Proposal

The William Woollett Aquatic Center conducted a field study to determine if the Lochinvar AQUAS pool heaters could optimize energy consumption in real-world scenarios. Two AQUAS model XPN1520 systems were installed on a 50-meter pool, while two Copper-Fin model CPN2071 pool heaters were installed on a second 50-meter pool at the exact location.

### The Installation & Test

The pool heaters were set up with individual gas meters, piping, and operated independently. A cascade control system was incorporated when installing the AQUAS systems. The two separate heaters in a cascaded system are managed as if they were a single heater. The Copper-Fin pool heaters were set up normally, with each control working on its own.

To evaluate the performance of the AQUAS pool heaters installed at the William Woollett Center, Lochinvar used combustion analysis equipment. Lochinvar put up wind meters around both pools to measure the amount of energy lost due to wind speed and how it affected fuel usage.

## The Results

It's important to consider the wind's velocity when reviewing the study's combustion analysis. The pool's position operating with the AQUAS systems was more impacted by the wind, making its heating system work harder than the adjacent Copper-Fin pool. Wind meters were strategically located throughout the facility to record wind speed across each of the two pool surfaces, along with a combustion analysis performed on both AQUAS pool heaters. Efficiency ratings were taken at different firing rates, ranging from 93% to 97% operation.

The results are as follows:

- The condensate was collected at a rate of 3.9 gallons per hour, with units firing at 100%.
- The condensate increased to 4.0 gallons per hour, with the units firing at 80%.
- AQUAS 1 = 93% @ 100% fire rate, 96% @ 80% fire rate.
- AQUAS 2 = 94% @ 100% fire rate, 97% @ 80% fire rate.

A therm usage comparison between the two different heater models are as follows:

<b>DATE</b> WIND SPEED	<b>AQUAS</b>	<b>Copper-Fin</b>	<b>Savings</b>
<b>26 MAR</b> NO DATA	<b>THERM</b> 34037 <b>METER</b> NO DATA	<b>THERM</b> 63914 <b>METER</b> NO DATA	NO DATA
<b>27 MAR</b> 5 MPH	<b>THERM</b> 34164 <b>METER</b> 127	<b>THERM</b> 64051 <b>METER</b> 137	7.3%
<b>01 APR</b> 2 MPH	<b>THERM</b> 34457 <b>METER</b> 294	<b>THERM</b> 64470 <b>METER</b> 419	30.1%
<b>02 APR</b> 2 MPH	<b>THERM</b> 34511 <b>METER</b> 54	<b>THERM</b> 64549 <b>METER</b> 79	31.6%
<b>03 APR</b> 0 MPH	<b>THERM</b> 34540 <b>METER</b> 29	<b>THERM</b> 64614 <b>METER</b> 65	55.4%
<b>09 APR</b> 3 MPH	<b>THERM</b> 35105 <b>METER</b> 565	<b>THERM</b> 65263 <b>METER</b> 54	22.2%
<b>12 APR</b> 8 MPH	<b>THERM</b> 35274 <b>METER</b> 127	<b>THERM</b> 65389 <b>METER</b> 126	-8%