

Developing  
the Solutions  
For You



September 20, 2013

## Flow Rate Monitoring for High Efficiency Heat Exchangers

A digital flow meter is a cheap and effective tool that can be used to diagnose a wide variety of problems when applied to high efficiency heat exchangers. At approximately three hundred dollars, the cost of a digital flow rate meter is well justified even if it diagnoses a single potential catastrophic failure on a heat exchanger that has a cost exceeding six thousand dollars. For this reason, Certol International recommends that all pools using a high efficiency heat exchanger buy a digital flow rate meter and monitor it at least once daily verifying the conditions below are being met. Certol International recommends the use of the Blue-White Industries, Ltd. F-1000 Series Digital Paddlewheel Flowmeter, or a digital model with equivalent accuracy, precision and resolution.

**Flow Rate Monitoring:** The flow rate of the water moving through the heat exchanger should be monitored and recorded. If the flow rate of the water through the heat exchanger changes, it is indicative of one of two problems. One, the pump moving the water through the heat exchanger is no longer functioning at the original specification. Two, there is scale build up within the heat exchanger impeding the flow of water through the heat exchanger. If the pump is verified to be working within its specification, the heat exchanger should be inspected for scale build up. If scale build up is confirmed, logs of the pool chemistry should be reviewed to ensure that the "ACID Magic<sup>®</sup> can be safely used in High Efficiency Water Heaters" recommendations were met. The scale should be removed using an anti-scaling agent that meets the heat exchangers manufacture specifications.

**Flow Rate:** The flow rate of water through the heat exchanger should be maintained near the manufacturer's maximum recommended flow rate. The increase in flow rate has two effects on potential scale formation. One, a faster flow rate increases the turbulence of the water flowing through the heat exchanger. This decreases the probability that scale formation will occur in the heat exchanger and adhere to the walls. Two, the increased flow rate will decrease the temperature differential between the inlet and outlet of the heat exchanger. The smaller temperature differential will increase the solubility of any calcium phosphate complexes.

**Visual Inspection:** It is recommended that the heat exchanger is visually inspected at least bi-annually. If scale build up is confirmed, logs of the pool chemistry should be reviewed to ensure that the "ACID Magic can be safely used in High Efficiency Water Heaters" recommendations were met. The scale should be removed using an anti-scaling agent that meets the heat exchangers manufacture specifications.