

## *Views From the E-List\* -- Water Temperature and Pool Thermometers*

### Query:

We are having a challenge with the water temp in our pool. Director says temperature is 86 degrees according to "computer" reading. Temperature readings off thermometer in the pool are difficult to read and can vary according to lifeguard and his/her ability to read the mercury. They just always say it is 86 degrees, although it could be between 84 and 88. Our Director says she replaces the pool thermometer every 3 months at least! (I've never heard of having to replace a thermometer that often!) I have brought in 2 different thermometers - one a kitchen meat probe style with a digital readout. I get 82 to 84 degree readings when the lifeguards say it is 86. The other is a borrowed old pool thermometer which reads 84 degrees. All we really know is that the clients are COLD and they did not used to be.

### Responses:

Many years ago in the last commercial pool that I operated - it was a 250,000 gallon indoor YMCA pool - we had a couple that came to swim laps every day. Every few days they would complain that the pool was cold, or claim that the water was just right that day...but it varied from day to day. Well, in reality, a 250,000 indoor pool will seldom fluctuate much, especially up and down as they claimed. So, one day while that were swimming, they asked the building maintenance person to come see how cold the pool was. We had a thermometer that resided in the gutter. She looked at the thermometer and it appeared that the temperature was much colder than it should be, then she touched the glass thermometer bulb- and the whole glass tube slid up and down changing the temperature reading....

I often use this story, because in that situation, our pool water temperature and air temperature/humidity were pretty consistent, but the perception of the swimmers was quite different depending on their perception of the water temperature, and I am sure that it was also somewhat dependent on their situation that day. I'm sure that we have all experienced jumping in the water when we are warmed up from a hot day outside or exercise- as opposed to jumping in the water when we have been lethargic or it is a cold wet day outside. We did have less complaining from those swimmers after we showed them the sliding thermometer scale, and, unfortunately, some of what you are experiencing, I believe, is simply perception.

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You will get different water temp readings depending on where you actually take the reading and/or put the thermometer. The only way to check variance is to put that thermometer in exactly the same location and water depth each time. Areas of incoming water, as well as overflow areas have different temps. Water at surface is different from water at 10 feet. Turbulence in water changes flow patterns of incoming water (the warmest) and that results in temp variance. Drafts across the surface change temp. Use a pool thermometer and take temp in same place at same time daily to assess consistency.

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I am NOT very knowledgeable on where a computer system actually takes temp. It could be that temp is taken as the water leaves the filtration system (but is not yet actually in the pool). That would result in a slightly higher reading than actual in-pool as warm water has not yet disbursed into larger water area.

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Our pool uses an infrared hand-held scanner and the lifeguards are instructed to test 3 different spots in the pool. This eliminates the inaccurate readings that may come from a thermometer being near water moving into the pool.

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I agree you need to take it in the same place, be careful you are not in front of your inlets, or that it isn't half out of the water. We have a probe type with the plastic cover and I take the temp with the cover on, it has an opening at the bottom that way the air flow across the water doesn't affect it. it is digital as well .

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Based on a question I received and the discussion on the elist, a competent friend in the technology area recommended the following link for digital temperature reading devices. It appears that they want to have a temperature tester that is digital and can test the temperature of water in the swimming pool. You might want to direct them to this link.

[http://www.coleparmer.com/catalog/product\\_index.asp?cls=6381](http://www.coleparmer.com/catalog/product_index.asp?cls=6381)

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I've been wanting to try an infrared scanner for some time now.

What brand do you use?

Does it measure consistently & accurately?

Any idea where to purchase one either online or at a store would be greatly appreciated!

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One pool I worked at had 4 thermometers in different places not just around the pool, but also through the pumping system. They were accurate and I would always use them in combination; the most they were ever off was by 1 degree. Many automatic chemical pumps now come with readouts for temp. Having a gauge in where you read your gallons per minute is also a very handy place to have it, or if you use an open dump tank with DE filters, where the water drains into before it gets filtered and is push/pulled back to the pool, that is another place to have a gauge.

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Infrared is not as accurate as you may think. It reads surface temperature and some of the infrared gets refracted away so you're reading something less. I experimented this thoroughly with some clients and engineers to prove it is more inaccurate than a thermometers in various places around the pool and it would read in the upper 80's when the water was actually 92-93 per the 4 thermometers.

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Yes, water will always be diff temps regardless of what mechanisms you use. If the water is still vs moving, temp will read differently. I have never and will never recommend infrared especially for water surface temp.

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We never replaced a thermometer except when it actually broke or it was time to change the probes in our automatic chemical pumps and the other 2 places we had gauges set in.

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Bottom line, like many things pool wise, be it temp, or chemicals, nothing is exact. It depends on your locations, on the activity in that location, etc. In a thermostat situation where water is heated to a certain degree, water is moving in that tube and usually that tube is around 6 inches in diameter and water is flowing around 400gpm. Our heat exchange would open and close a valve to let water heat depending on the temp it detected and that sat in a whole other area of water flow far away from the actual pool.

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We got our thermometers from Leslie's Pool Supplies. Standard, big numbers, white, and floats and has a string we used to attach it to a lane line. Been using these for over a decade and have never had problems. I do suggest using pool thermometers, not those for household.

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My most memorable incident regarding temp was when our members complained that we had the thermometer "fixed" so it would always read 92. We ask them to then bring in their own, unopened, and new to test. So they did. 1 hour later, it read 92. We never had a problem after that.

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If your clients are cold and the pool reads 86, then instead of evaluating the temp, consider raising the temp. Calculate how much gas/electricity you are using now and what you may be losing in revenue to clients quitting, and see how much you may have to gain by raising it up 1-2 degrees.

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We purchase thermometer from our auto parts store. It costs about \$75.00. I will sometimes pull out a standard pool thermometer and get a difference of about 0.5 degrees (Max has been 1.5 degrees). When we "shoot" the water I try to do it about 3 times and take the median value. We use a Raytek brand.

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I have known operators in the past that say the pool is "the normal temp" even when it is off 3 degrees or more. A lot of times in older facilities the internal temperature controls don't read accurately. The sensor also may be near some external heat source giving high readings to the computer. Also if the probe was installed down pipe of the heater they may be only getting really short heating cycles that "say the pool is 86", when it is only there right outside the heater.

Also I would point out that there are times I have run across people that just experience a different perception about how warm the pool is. I don't want to just seem like I am going after the operator as I am one. Also due to different external factors (budget constraints, changes in management philosophy, etc) the pool may be kept colder and the guards may not have been told. Especially if you only have one pool tank in a facility the generally accepted middle ground temp is 84 degrees (check out USA Swimming's facilities development page).

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*\*Opinions and suggestions expressed in this column represent e-list member responses to the query posted. They are not represented by the Aquatic Therapy and Rehab Institute and/or the author(s) of this column as recommendations regarding appropriate practice.*