Obnoxious Odors at Indoor Pools

Clearing the Air: Chloramine Control for Indoor Swimming Pools

Perhaps the most perplexing and controversial problem facing heavily used indoor pools today is chloramine production. Chloramines cause obnoxious odors as well as skin, eye, and respiratory irritation that many swimmers mistakenly attribute to chlorine itself. When chloramine levels become troublesome (0.3-0.5 parts per million (ppm)), people begin to complain. And while much finger pointing takes place, often little progress is made in correcting the problem. Swim coaches and competitive swimmers blame the pool operators, while pool operators in turn blame the swimmers; pool chemists blame the ventilation systems, whereas those in charge of air handling blame the water chemistry.

But who truly is to blame? And how is the problem fixed? In reality, ***everyone*** is to blame when chloramines are produced, and ***everyone*** has a role in controlling them. While a heavily used pool may never be completely chloramine free, you can greatly reduce chloramine production through good pool management practices.

Chronic chloramines and the associated smell and irritation are caused by a variety of factors. Despite what many swimmers assume, the major cause of these problems is *too little free chlorine* rather than too much! "Free" chlorine, used to kill germs and help prevent the spread of waterborne illnesses, also oxidizes natural waste products from swimmers, including sweat, body oil, urine and other ammonia-nitrogen compounds. If the free chlorine levels are not sufficiently high to oxidize these nitrogenous wastes, the free chlorine combines with them to form noxious cholarmine compounds. Whenever someone calls me with a chloramine problem, the first thing I tell him or her is that once they shock their pool (shock treatment will be discussed below) they should maintain a free residual of *0.5ppm higher* than usual. This higher level of chlorine usually does the trick.

Another remedy that is rarely used but very effective is to enforce soap showers prior to swimming. A soap shower will remove excess body oils and sweat, thus greatly reducing the amount of body waste going into the pool. Some pool chemists claim that if everyone showered prior to swimming, it would reduce the chlorine demand by 50%. So perhaps you could get your swimmers to shower if you told them to shower, not because they are dirty but rather because their body oils react with chlorine to produce the smell they hate. Along those lines, competitive swimmers produce a great deal of sweat when they train rigorously. There is absolutely no way to avoid this, so you must plan on combating the perspiration that they will normally and regularly produce.

Even with the cleanest swimmers and the best water chemistry, though, chloramines can be a problem. If you have an energy efficient air handling system that re-circulates the air, often the chloramines are re-circulated and trapped in the building because they cannot escape. Air handling systems must bring in lots of fresh air and exhaust full blast when the pool is busy. If this is not done, chloramines will keep building. If the air handling system does not significantly exceed existing ASHRAE standards, then a heavily used pool will probably have an air quality problem.

Ever notice how you don't notice chloramine odors at an outdoor pool? As they say, "No harm, no foul."

Once you have an abundance of chloramines, they are not easy to get rid off. Just like algae growth in swimming pools, the key is prevention. And just like "Layers of Protection" for drowning prevention we also need "Layers of Protection" against chloramines. To help prevent *and* rid your facility of chloramines once they develop, you may want to experiment with a combination of the following:

- "Shock" more often with free chlorine. Shock treatment involves raising the free chlorine level to at least 10 times higher than the combined chlorine level. Weekly is best for most pools but it may be required even more often for extremely heavily used pools.
- Use a non-chlorine shocking agent like the monopersulfate-based oxidizers. These reduce chloramines without adding chlorine. Many pool operators find alternating between traditional chlorine and the non-chlorine shocking agents works best.
- Add volcanic ash to your sand filters. This holds the ammonia in the filter tanks rather than in the swimming pools. Zeolite works well but must be regenerated to be effective in the long run.

- Granulated Activated Carbon (GAC) filters may also be added to your existing filtration/circulation systems to remove ammonia that produces chloramines in the pool water.
- Anticipate heavy bather loads. When you know your swimming pool is going to be inundated with swimmers either by way of a swim meet, swimming lessons or a huge rental or party, take preventive action prior to the swimmers arrival.
- Shock the pool and keep the free chlorine levels up extra high before the swimmers enter the pool. Insist that the group shower before entering. These preventive measures will do wonders in keeping chloramines formation to a minimum.
- If you have a good clean source of fresh water, give your filters and extended backwash so that you drain off lots of water (up to 1/3 of your pool volume) and replace it with fresh water.
- Vacuuming and brushing your pool daily also removes much of the dirt chlorine reacts with that your filters have not caught yet.

A word of caution -- Many water companies are using chloramines to disinfect the water they supply their customers. If your source water is disinfected with chloramines, as many are, you have an uphill battle on your hands. The facility may need to strip the chloramines with a GAC filter as the water enters the building and before it enters the swimming pool.

Finally, most of the "ideal" ranges recommended for chlorine in public swimming pools are simply too low and just plain wrong. Heavily used pools often need 3.0 - 4.0 PPM in order to prevent chloramines.

This information provided to you by the IES safety committee