

DXAIR INDOOR POOL DESIGN GUIDELINES

POOL CHEMISTRY & PH BALANCE



Swimmers will often blame the strong chemical smell of pool water on “too much chlorine”. Skin that itches, red eyes, coughing, sore throats, and other irritations and respiratory ailments— along with the strong odor is **NOT** due to chlorine, but to chloramines. These are chemical compounds that build up in pool water when it is not properly balanced. A chlorine odor in your indoor pool indicates a very high chloramine level.

Where do chloramines come from?

Chloramines form when “free” chlorine is combined with ammonia, nitrogen, and various other compounds that can be found in perspiration, urine, body oils, lotions and saliva to name a few. Swimmers can help to prevent this problem by showering before entering the swimming pool. Chloramines are also found in city water. A very high chloramine level indicates the pool chemistry is out of balance and in turn, creates a highly corrosive environment. Left uncontrolled, this chemistry attacks and destroys equipment, metal, wiring, controls, other surfaces, equipment, controls, and structural members.

A dehumidification system can remove excess moisture from the natatorium; however it cannot eliminate nor control the harmful chlorine compounds or control patrons entering the pool without taking showers, or children in diapers or using the pool as their bathroom! Many companies today are recommending more outside air—meaning “dilution is the solution”. Unfortunately, this has nothing to do with air flow and everything to do with the water, which HVAC contractors cannot control.

The dehumidification system does not cause this problem, nor can it “fix” the indoor air quality —as this is a water quality issue.

- Although some companies recommend blowing air across an open pool, we—along with many designers, do not recommend this procedure. Indoor pools are not (and should not be) designed to have large amounts of air blowing across a water surface. This air movement across the water cannot control chloramines, has a “chill effect” on patrons, and is a waste of energy because it increases evaporation rate of water.
- Return air should NOT be installed at the deck level to pull this contaminated air into the dehumidification system where it is highly corrosive. The return air in a pool room is installed at the highest (or near the highest, depending upon ductwork installation) point of the room. Warm moist air in a pool room rises and stratifies along the ceiling first. Dehumidification starts on the return air side by pulling this air through the system. Therefore, if the return air is at the deck level, the dehumidification system may not operate properly to control the environment and early deterioration of the structure may occur. Installing huge return air at deck level can may also interfere with negative pressure.
- Introducing a higher volume of outside air does not control the water chemistry problem and also creates additional energy costs for owner/operators. Proper air turnovers and the air delivery system can help...but it still remains a water quality issue.

UNDERSTANDING YOUR POOL CHEMISTRY!

Residential & Commercial pool operators may receive complaints from swimmers/owners and pool staff about stinging eyes, nasal irritation, or difficulty breathing after being in the water or breathing the air at swimming pools, particularly indoor pools. New research indicates that these symptoms may be an indication of poor water and indoor air quality at the pool caused by a build-up of irritants, known as chloramines, in the water and air.

Irritants in the air at swimming pools are usually the combined chlorine by-products of disinfection. These by-products called chloramines are the result of chlorine binding with sweat, urine, and other waste from swimmers. As the concentration of by-products in the water increases, the off gassing of these chloramines into the surrounding air occurs. Breathing air loaded with irritants can cause a variety of symptoms depending on the concentration of irritants in the air and amount of time the air is breathed. The symptoms of irritant exposure in the air can range from mild symptoms, such as coughing, to severe symptoms, such as wheezing or aggravating asthma. It is also known that routine breathing of irritants may increase sensitivity to other types of irritants such as fungi and bacteria. The other side of this equation is that this environment becomes highly corrosive when pools are not balanced properly. Equipment will show signs of rust, corrosion, coils can leak due to pinhole corrosion of coils, controls and peripheral items can be destroyed in a short amount of time. HVAC and dehumidification systems do not cause chloramines, nor can these systems resolve this issue. It all starts with good pool chemistry!

The buildup of these irritants in the air is partially due to three common factors: Lack of showers prior to entering the pool, poor pool balancing techniques and potentially poor air turnover rate within the structure. Generally speaking, pool balancing and improper chemistry is the first culprit when you can smell chlorine. If the system is designed with the proper number of air turnovers and the duct work or air delivery system is sized and installed properly, the dehumidification system cannot be blamed for over or under chlorination of a swimming pool. Many companies recommend blowing air across the open pool to try and remove the contaminated air; however this creates increased evaporation and a chill affect on swimmers.

Many companies recommended bringing in more outside air- again – “DILUTION IS NOT THE SOLUTION”. This is generally not recommended either. Secondly, chloramines are “heavy” in nature and “sticky”—blowing them around the pool room does not result in better air quality. Actually, surfaces must be washed down to remove chloramines. Please note that good air flow can help, but it cannot resolve the chlorine/chloramine issue. The use of salt water pools today is also increasing which increases the problems of corrosion, pinhole leaks in coils, failing heat exchangers—as salt is highly corrosive. Salt water pools appear to have more difficulty in maintaining balance and should be reviewed carefully prior to establishing the chemicals or chemistry you will use.

Combined chlorine levels in the water may be reduced by adding secondary disinfection systems, such as ultraviolet light or ozone. In addition, good hygiene is needed. Getting swimmers to shower before getting in the pool and promoting regular bathroom use to reduce the amount of urine in the pool will decrease the formation of irritants. Spend time with your pool company or pool chemistry professional. It is imperative that all customers be educated in the proper techniques for maintaining their environment & for checking and balancing the pool water at all times.

Introducing more outside air DOES NOT SOLVE THE CHLORINE PROBLEMS!!!



Overchlorinating pool water, chemical spills, and improper pH balance of pool water leads to corrosion of equipment, wiring, relays, etc. This hotel system was only 6 months old

