



# How HVLS Fans Support Healthy **Aquatic Environments**



Although natatoriums are a great place to race during a meet or enjoy an afternoon swim, the aquatic environment demands a thoughtful building design and proper maintenance. Natatorium owners and operators will find that two facility management concerns – chloramines and condensation – can be minimized by using HVLS fans.

## Common Natatorium Air Quality Concerns

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The most common air quality concern stems from using chlorine to treat pool water. Chlorine disinfects to protect the health of swimmers, but when it combines with organic pollutants in the water (sweat, oil, etc.) it creates chloramines. Chloramines, not chlorine, are responsible for the well-known “pool smell.” Even more concerning than the smell is the fact that chloramines can pose health risks as they build up and become airborne. Symptoms of overexposure to chloramines include irritated eyes, nose, mouth, and lungs.

Another facility management concern is condensation. Indoor moisture levels are high in natatoriums making the surfaces susceptible to condensation. Particularly in cold climates, condensation is likely on the windows, doors, and even in the walls and roof. Frequent and prolonged condensation causes biological growth and corrosion.

## Why Airflow is Critical in Natatoriums

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Good air quality is important to swimmers and spectators, and it’s also a national concern. In 2014, the U.S. Department of Health and Human Services’ Center for Disease Control and Prevention released its [Model Aquatic Health Code \(MAHC\)](#).

In Section 4.0, the MAHC lays out many air handling system requirements for natatoriums. High Volume, Low Speed fans help achieve these requirements by accelerating the air turnover rate by thoroughly mixing the air. There are three MAHC directives that HVLS fans help accomplish:

**1. CONDENSATION PREVENTION:** “Indoor aquatic facility building envelope construction shall include a vapor retarder/insulation arrangement to assist in preventing the condensation of water on inside building surfaces under the coldest outdoor conditions.”

Natatoriums are often humid. They have a high dew point, meaning that there is a high concentration of water vapor in the air. If this air, heavy laden with water vapor, meets a cooler surface, it will deposit the moisture on that object, creating condensation. Facilities with prolonged condensation issues will experience biological growth and corrosion of their building materials. HVLS fans offset humidity by homogenizing the air thereby equalizing the temperature, minimizing moisture deposits, and speeding up the drying process.

**2. CONSISTENT AIR FLOW:** “Indoor aquatic facility air handling system shall be designed to provide consistent air flow through all parts of the indoor aquatic facility to preclude any stagnant areas.”

Stagnant air is problematic for three reasons: first, natatoriums have building requirements for the amount of time it takes to turnover all the air in the space. If there are stagnant areas, this requirement is not being met. Second, inadequate air circulation makes swimmers and spectators uncomfortable. Third, stagnant air promotes condensation buildup. HVLS fans eliminate stagnant air by delivering consistent air flow throughout the facility and accelerating the air turnover rate.

**3. AIRFLOW ACROSS WATER SURFACE:** “The Air Handling System shall be designed considering airflow across the water surface to promote removal of disinfection by-products (chloramines).”

After chlorine combines with the organic pollutants in the pool it becomes a chloramine and hovers over the water. Chloramines are four times heavier than standard air. How do you pull something so heavy up and out through an exhaust system? Increase airflow across the pool surface. HVLS fans deliver large volumes of air at adjustable speeds to propel the plume of chloramines up to the exhaust system.

## HVLS Fans are Designed for Natatoriums

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**1. LARGE FANS FOR LARGE SPACES:** An Olympic-size swimming pool is 50x25 meters. The pool size must be multiplied by about three to include the space needed for the pool deck, spectator seating, changing rooms, and equipment areas. It’s a very large space! HVLS fans generate massive columns of air that move air throughout large spaces. The largest HVLS fan is 24-feet in diameter and moves 365,000 cubic feet of air per minute.

**2. CORROSIVE ENVIRONMENT:** Because indoor aquatic facilities are considered wet and corrosive environments, it’s important that HVLS fans can tolerate such an environment. Moisture may seep into poorly designed fans and damage the electronics, rendering them useless. An HVLS fan should be rated IP65 or higher to avoid these issues. Products with this IP rating are sealed against dust and moisture. To prevent deterioration, the fan components, like connecting hardware, should be stainless steel. It’s also important to choose blades that are anodized aluminum, not raw aluminum.

## The Bottom Line

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HVLS fans promote healthy aquatic environments by completely circulating the air in the facility. Thoroughly mixing the air equalizes the temperature, minimizes moisture deposits, and speeds up the drying process. The airflow from HVLS fans also accelerates the air turnover rate by eliminating stagnant air and propelling chloramines up to the exhaust system. HVLS fans help natatorium owners and operators provide a fun, safe, and comfortable environment for swimmers and spectators.