



RECREATIONAL WATERS // CHLORAMINES



APPLICATION: Chloramines Reduction // **MARKET:** Recreational Water // **LOCATION:** Division 1 University, Ohio, USA

JUMP ON IN, THE WATER'S GREAT!

A major Division 1 University in Ohio has grown to become one of the nation's largest in terms of enrollment, academic achievement, and premier student facilities. This proud institution often ranks in the Top 20 national public universities.

Located in the heart of Ohio, the university is home to over 57,000 students and is a vital institution to the local community.

Physical and wellness activities are important elements of the University's culture. The Office of Student Life's Recreational Sports, also known as Rec Sports, supports students of all ages and abilities in the pursuit of an active, healthy lifestyle. Aquatics is an important part of that lifestyle and also represents a growing interest in water sports, and general recreation.



The Division 1 University Aquatic Center

The university's Aquatic Center boasts four pools and two spas, and offers open swimming, aquatic classes and lessons. It is open to the student body and university community, and is also home to the University's varsity men's and women's swimming and diving teams.

Chloramines Concerns

The Aquatic Directors strive to create a safe and healthy environment and are continually evaluating ways to improve facilities, streamline maintenance processes and enhance patron experience. In the Aquatic Center, the reduction, control, and management of chloramines was an ongoing challenge, particularly in the leisure spa, leisure pool, recreational lap pool, and dive spa. A chloramines gas blanket typically occupies the 1.5 – 2 foot level right above the water surface. Some of that blanket dissipates upward into the facility ceiling area, but a significant gaseous layer remained present at the surface of the water. The presence of chloramines detracted from the overall bather and competitor experience, and became an issue.

Additionally, the reduction of the State Health Code maximum limit for chloramines (from 2.0 to 1.0) was a challenge to maintain, as high concentrations of chloramines, testing in the range of 1 to 3 parts per million (ppm), were routinely present. As a result, pool chemistry and swimmer discomfort (i.e., eye, nose and throat irritation) became a significant problem in need of addressing.

The treatment processes in place at the time included sand filtration and automatic chlorine feed. Chlorine molecules can combine with ammonia and nitrogen compounds in the water to form chloramines. Ammonia and nitrogen compounds are often introduced into the water by swimmers, in the form of perspiration, urine, saliva, and sputum.

In an effort to keep the issue under control and burn off the chloramines, super-chlorination, also known as "shocking," was done on a regular basis. However, this increased operational costs, required staff to handle dangerous chemicals, and also required that the pools be closed for longer periods of time for maintenance.

The Aquatic Center Directors took immediate action; their primary goals were to provide a better aquatic experience for users, and to ensure compliance with the State Health Code's new regulations.

// CASE STUDY

The UV Movement

The Directors were knowledgeable about ultraviolet (UV) disinfection and chlorine and chloramine reduction, and the many benefits it brings to the multi-barrier water treatment process. This powerful technology has been successfully used on swimming pools for many years, and is proven effective in the destruction of chloramines.

UV disinfection of pools and splash parks is also an effective way of inactivating a wide range of waterborne pathogens, particularly *Cryptosporidium* and *Giardia*. UV is recommended by the Centers for Disease Control and Prevention (CDC) as one of the additional treatment steps for *Cryptosporidium* inactivation in swimming pools. This powerful technology is cost effective and also ideal for large flow rates, with varying degrees of water quality that are typically found in large recreational water facilities. UV reactors are often configured with an automated cleaning device called a "wiper" to optimize dosage delivery and reactor efficiency. Operators typically find the UV technology user friendly, and often refer to the equipment as plug and play, as it requires only minimal maintenance.

In recreational water applications, the UV equipment is not used to replace chlorine. However, by eliminating the need for regular "shocking," well-maintained pools can see significant reductions in chlorine usage. In addition to bather discomfort, chloramine off-gassing is also a serious maintenance and HVAC issue, and can have significant impact on duct work and various ceiling fixtures.

After careful consideration and thorough technology exploration, UV was added to the treatment process. The project was awarded to Aquafine. Contributing factors in the decision process included local service, American-made equipment, and excellent project support. Installation was completed in the summer of 2013.



Ideal Swimming Conditions

Aquafine MPR systems were installed on six pools in the Aquatic Center, in accordance to the University's "Swimming Pool Ultraviolet Disinfection Equipment and Installation Specification." Aquafine acted as the General Contractor and supervised the installation and project management. These systems use medium-pressure (MP) lamp technology and are well-suited for flow rates greater than 25 gallons per minute (GPM). By utilizing MP technology, lamp count

LOCATION	AQUAFINE UNIT TYPE INSTALLED
Competition Pool	MPR-4L12
Dive Pool	MPR-2L12
Dive Spa	MPR-1L12
Leisure Spa	MPR-1L12
Recreational Lap Pool	MPR-1L12
Leisure Pool	MPR-1L12

Figure 1 // Aquafine MPR systems were installed on six pools in the RPAC Aquatic Center.

is reduced by up to 90 percent, which ultimately reduces footprint and maintenance intervals.

Since installation, the units have reduced and maintained levels of chloramines to below 0.3 ppm and improved the overall water quality. The response from swimmers was both immediate and very positive.

"Aquafine's support and project management has been good from the procurement phase, through system start-ups," says the Aquatic Center Management. "The MPR equipment has been running effectively with no issues or concerns."

DATE	LEISURE SPA	LEISURE POOL	RECREATION LAP	COMP POOL	DIVE POOL	DIVE SPA
4/13/13	2.2	1.0	0.4	0.4	NO	NO
4/20/13	1.6	0.3	0.4	0.4	0.2	0.4
4/23/13	2.2	1.2	0.4	0.6	0.0	0.8
5/29/13	0.6	DRAINED	0.4	0.2	0.0	0.6
6/1/13	1.0	DRAINED	0.4	0.4	0.2	0.6
6/4/13	0.8	DRAINED	0.4	0.2	0.2	0.4
6/29/13	0.4	0.6	0.4	0.2	0.4	0.2
7/2/13	0.6	0.8	0.4	0.4	0.2	0.4
7/11/13	UV INSTALLED					
7/25/13	0.0	0.2	0.2	0.0	0.0	0.0
7/30/13	0.2	0.0	0.0	DRAINED	0.0	0.0
8/1/13	0.2	0.0	0.2	DRAINED	0.0	0.2
8/3/13	0.2	0.2	0.0	DRAINED	0.0	0.0
8/6/13	0.0	0.2	0.0	DRAINED	0.0	0.2
8/17/13	0.0	0.2	0.0	0.0	0.2	0.0
8/20/13	0.2	0.2	0.2	0.0	0.0	0.2
8/22/13	0.2	0.2	0.2	0.0	0.0	0.0

Figure 2 // Historical data showing chloramines ppm levels before and after the installation of Aquafine MPR systems. The light blue line indicates when the UV systems were installed.

For questions regarding your application needs, please contact your local Authorized Distributor or Aquafine for more information.