Analysis of Pool Filtration Systems

Did You Know?

All swimming pools require a secondary form of sanitation

- Chlorine is effective in neutralizing most organics, bacteria, viruses and fungus
- Although the above is neutralized, it is still present in the water and is now called chloramines
- Chloramines in the water can cause eye, skin, throat and lung irritation in swimmers. It also results in strong chlorine smells in pools
- A very strong secondary oxidizer is required to remove the chloramines from the pool water
- This can be performed either by the use of chemicals or U.V. Ultraviolet can perform this operation chemical free

Town of Markham Current Practice of Liquid Chlorine in Pools

ADVANTAGES

- Bulk tanks eliminate the need for staff to manually handle (safe to operate)
- Minimal maintenance to the system
- Very low cost to maintain on a yearly basis
- Very responsive to high bather loads during peak periods

DISADVANTAGES

- No additional protection from chlorine resistant parasites

Salt Water Pools

- Salt when added to water breaks down into sodium and chloride
- Salt generators provide a low voltage high current
- Passing the salt water through the current results in the chloride ions forming chlorine, the primary sanitizer
- Salt water pools are chlorine pools with the same chemical and operational issues as chlorine

Salt Water Pools

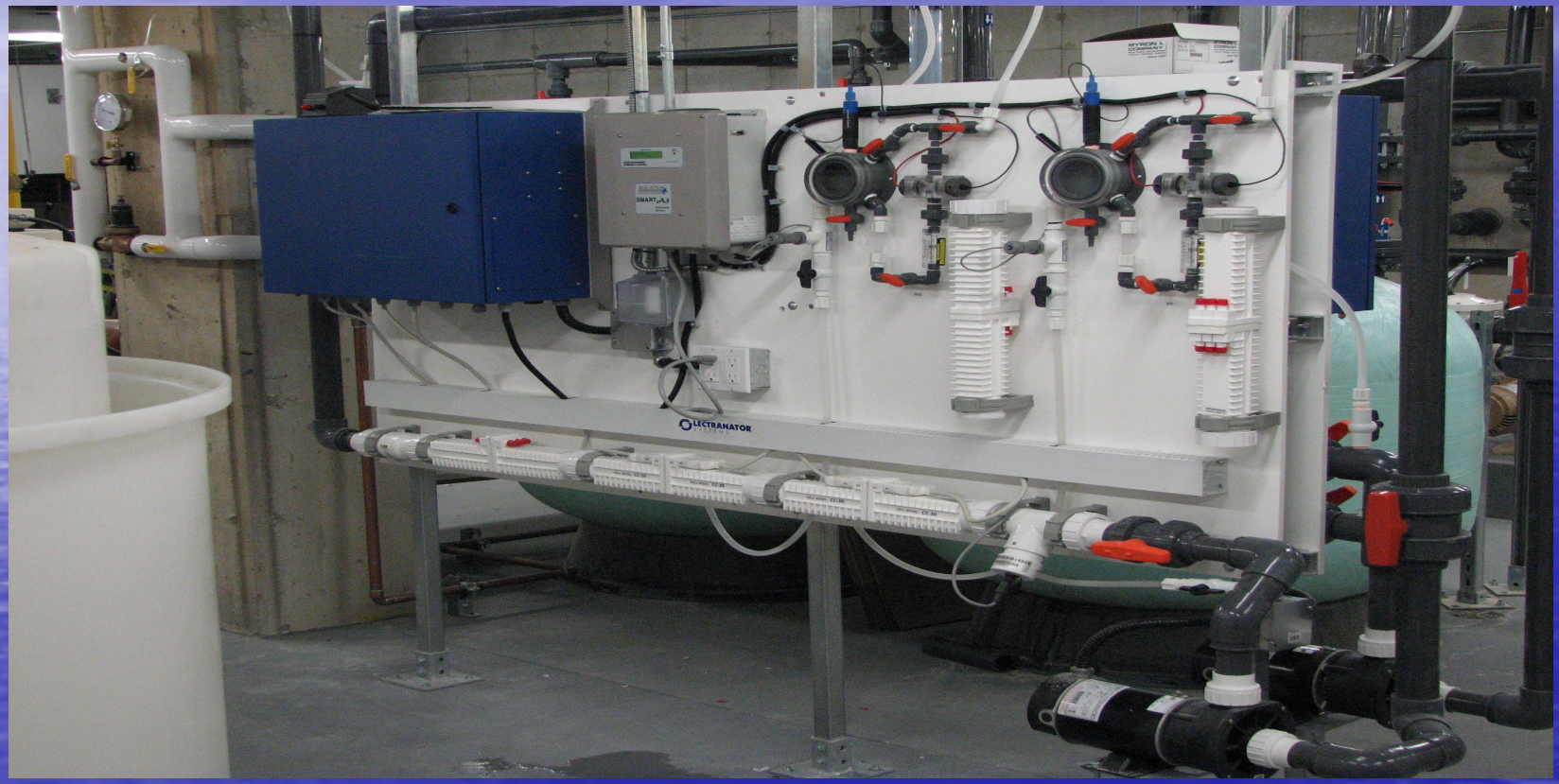
ADVANTAGES

- Water feels "softer"
- Customers may feel more comfortable in the water
- Safe for staff to operate

DISADVANTAGES

- Salt cells have a very short life – every 1-3 years maximum
- Waste water releases chlorides into the environment which is not an environmentally friendly alternative
- Extremely corrosive on metal components, pool mechanical equipment, and building envelope
- Difficulty in maintaining normal operating chlorine levels in peak bather periods
- Costly to install and extremely expensive to maintain due to short cell life span
- No additional protection from chlorine resistant parasites
- Skin may become itchy if bathers do not shower after salt water pool use
- Requires a secondary form of sanitation to maintain safe chlorine levels in peak use high volume pools

Typical Salt System



St. Mary, Ontario

Installation 2008. Cost $84,000.

Financial Impacts –Capital Cost

Capital Costs to Install (-) Number of pools/facility	Salt System
Angus Glen (3)	$86,000
Centennial (4)	$108,000
Milliken Mills (3)	$86,000
Thornhill (3)	$73,000
Thornlea (1)	$35,000
Morgan (2)	$57,000
Rouge (1)	$35,000
Total	$480,000
Total (10% engineering)	$48,000
Total	$528,000

Average Yearly Maintenance Costs

	Salt System
Angus Glen	$10,000
Centennial	$12,000
Milliken Mills	$10,000
Thornhill	$6,500
Thornlea	$3,500
Morgan	$2,000
Rouge	$1,200
Total	$45,000

UV for Indoor Aquatics Secondary Sanitizer

- Eliminates chloramines, the major source of skin, eye, throat and lung irritation among swimmers
- 24 hours, 7 day continuous destruction of chloramines
- Safe and chemical free
- UV does not result in the creation of harmful bi-products. An environmentally friendly alternative
- UV does not alter water chemistry and its constituents such as PH, taste, odour, color, etc.
- UV is widely used to disinfect drinking water and waste water worldwide and has been for a number of years
- Aquatic consultants are recommending liquid chlorine with UV for new construction and renovations of indoor pools

Industries Using UV Technology

- Pharmaceutical
- Food and beverage
  - Bottled water
  - Brewing
- Petrochemical
- Aquaculture
- Municipal waste water
- Municipal drinking water
- Pulp and paper
- Printing
- Commercial and municipal pools

Liquid Chlorine with U.V.

ADVANTAGES

- Destruction of chlorine resistant parasites
- Fast acting, instantaneous
- No bi-products, environmentally friendly
- Safe and chemical free
- Does not alter water chemistry
- Proven and trusted in municipal drinking water
- Reduced chemical use – no more pool shocks, break point or super chlorination
- 24 hour, 7 day a week destruction of chloramines (the major source of eye, skin, throat lung irritation, and chlorine odour in pools)
- No overdosing possible
- Reduction of chloramines reduces building deteriorization

DISADVANTAGES

- None known

A Typical Pool Medium Intensity UV System

Financial Impacts –Capital Cost

Capital Costs to Install (-) Number of pools/facility	UV System
Angus Glen (3)	$98,000
Centennial (4)	$121,000
Milliken Mills (3)	$98,000
Thornlea (1)	$46,000
SUB TOTAL	$363,000
Total (10% engineering)	$36,300
Total	$399,300

It is recommended that Centennial Pool be completed in 2009 with a total cost of $133,100 (including engineering fees)

Average Yearly Maintenance Costs

	UV System
Angus Glen	$5,000
Centennial	$6,000
Milliken Mills	$5,000
Thornlea	$2,000
Total	$18,000

Recommendations

- That the Town of Markham aquatic facilities continue to use liquid chlorine as the primary form of sanitizer in all Town pools
- That Council consider the submission of medium intensity UV in all bodies of water in the four major pool facilities (Angus Glen, Milliken Mills, Thornlea and Centennial) in the 2009 capital budget submission in the amount of $400,000 and that the $18,000 in operating costs be included in the 2009 operating budget.
- That Shore Tilbe Irwin and Partners be directed to incorporate liquid chlorine with the addition of medium intensity UV in the design of East Markham Community Centre


Questions