

ECOsmarte® Commercial Pools



I-494 at MSP Airport and Mall of America
Minneapolis, MN



The Science Behind ECOsmarte



- ECOsmarte[®] is the only alternative sanitizer device certified and registered with all three of the following regulatory agencies: US EPA, Australian APVMA, and Health Canada.
- Ionic copper, or Cu^{++} , kills e-coli, bacteria, staph, and coliform at a low-level residual. Ionic copper is very stable and unlike chlorine will not disappear in high heat. Ionization was developed in the 1960's by Honeywell in Minneapolis, MN to kill microbes in drinking water for the Apollo Moon mission.
- ECOsmarte[®] advanced electronic oxidation technology uses titanium/platinum electrodes with a proprietary noble metal coating to oxidize contaminants and the water without the use of sodium or chemicals, and without affecting swimmers.
- The water molecules contains oxygen and when the electrodes receive power they generate OH hydroxyl ion, theoretical atomic oxygen (O_1), and oxygen (O_2). 40 grams of oxygen radicals per minutes are produced (O_2 can be easily confirmed with a D.O meter). No ozone is produced.
- ECOsmarte[®] naturally produces all of these oxidizers: OH hydroxyl radicals, atomic oxygen, oxygen, and Hydrogen Peroxide using electronic oxidation technology. Each oxidizer produced is more powerful than sodium hypochlorite (bleach). With this oxidation technology one can specifically target Uric acid, bacteria, and virus. Combining this technology with ionic copper produces a strong antimicrobial and antibacterial sanitizer, resulting in a clean swimming environment.
- With our oxidation technology we have the ability to take carbonate minerals and “soften” them by transforming them into bicarbonates (water soluble). In effect we have a pool that will not scale, feels silky smooth to the skin, and any typical scum lines from a normal pool are easily wiped away.

ECOsmarte in Commercial Applications

- With ECOsmarte® you will cut your chemical use by 50 percent to 80 percent and provide a zero-chloramine swimming environment. There is no combined chlorine, only free chlorine. There are also no VOC's or haloacetic acids. We do this on commercial pools between 15,000 and 750,000 gallons (50 meters) for 1/3 of the cost of ozone or UV.
- Chlorine combined with trace copper has the best kill-rate available for giardia cyst, staph, bacteria, e-coli, and many other microbial threats.
- ECOsmarte® has a long standing successful record running alongside chlorine in commercial applications around the world. (In all cases running 1 ppm free chlorine or less.)
- No more burning eyes, dried out hair, or irritated skin, with a lowered halogen and VOC level. Less chlorine is used to reach the required residual because there is no combined chlorine.
- Less chemical is needed to maintain pH with the ECOsmarte® Programmable pool system featuring CO₂ injection for pH control. CO₂ buffers against rain (whether it is alkaline or acidic), weather, and will protect alkalinity.



Replaces 11 inches of pool pipe between pump and pool.



Replaces 11" of pool pipe and may install vertically.

Using CO₂ for pH Control

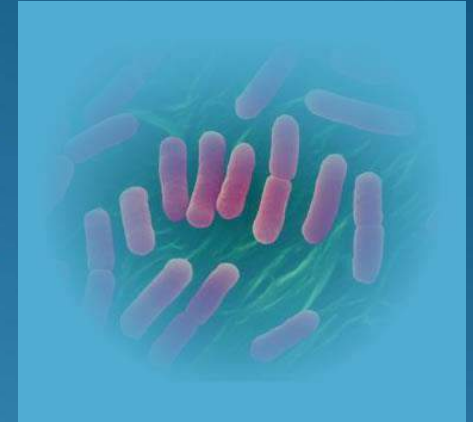
- It is vital to maintain the pH level in any pool, spa, cooling tower, and grey water system (closed loop system) or else the sanitizer becomes ineffective at bacteria, virus, and mold control.
- CO₂ is uniquely able to lower pH while raising carbonate alkalinity. It is a soft pH down, buffers against acid rain, and is unable to lower the pH below 6.7 at 90 degree water temperature.
- ECOsmarte[®] has maintained and installed over 10,000 sites where CO₂ is implemented for pH control. We are the world leader in carbonic acid for pH control in commercial and residential applications in both the swimming pool and aquarium industries.
- The top three reasons for injury or death to swimmers are: electrocution, drowning, and malfunctioning acid feeders. Carbonic acid is the answer to eliminating one of the key safety hazards for any commercial pool operator.
- Typical sensor driven pH down applications open solenoids and regulators 30 to 100 times in a 24 hour period significantly reducing lifespan of CO₂ mechanical components. ECOsmarte[®] CO₂ opens and closes for four equal increments throughout the daily run-time with a fixed injection rate, lengthening the life span of the solenoid and other CO₂ equipment.

Glass Media for Commercial Applications

- ECOsmarte GlassPack® is made from 100% sanitized recycled bottle glass. It is produced with a proprietary wide-mesh range and is used as an upgrade for your sand filter www.glasspack-filter.com.
- Glass has a slight negative charge on the surface which tends to hold on to fine particulate during filter cycles. Upon backwashing this charge releases the fine particulate. This charge allows the capture of more contaminants while retaining a higher attrition strength and it does not permanently trap bacteria in cracks.
- It is commonly used in storm water runoff, fracking, ground water reclamation, and commercial pool applications.
- Glass media will filter 2 to 5 microns, require ¼ the backwashing of silica, and have an 8 year lifespan compared to 3 years with sand, provides 25% better turbidity removal, will hold positively charged iron and manganese, is less likely to channel or block like sand, and will lower your need to use algacide or non-chlorine shock.
- Glass cleans better and will filter giardia cyst, blood cells, skin cells, hair, iron, manganese, and 70% of bacteria. In addition, it will save time, money and water usage. Commercial backwashes are reduced 75%, saving heat energy, electricity, and labor.

Also Removes E-coli Bacteria

GlassPack® media in commercial applications offers perhaps the most immediate benefit for pools with high bather loads. The financial savings pay back the costs in less than one year. In addition, GlassPack® filters skin cells, blood cells, e-coli, and numerous pathogens



1. By reducing the amount of water used for backwashing, chemicals, calcium, and heat energy are saved.
1. Finer filtration allows the elimination of both “shocks and flocks” to remove skin cells, blood cells and hair from the swimming pool.
1. ECOsmarte® sterilizes recycled bottle glass and uses a proprietary mesh to maximize the filter loading. Other glasses will outperform sand but will generally last half as long as GlassPack®.

Maintenance

- Copper bars are replaced every 1 to 3 years, depending on the pool. A single chamber will support up to 50k gallons. Bather loads greater than 1 swimmer per 35 liters per day, infinity edges and other water features will require additional chambers for the same volume of water.
- The titanium/platinum electrodes will yield a 3 to 5 year life span, running 24/7.
- CO₂ solenoid and regulator should be tested semi-annually and should be replaced every 3 years.
- The electrode chambers and the CO₂ chambers should be cleaned quarterly, soaked in 5 parts water and 1 part Muriatic acid.
- Daily water testing is required on all commercial sites.
- There are no sensors to calibrate or replace.

50 Meter Olympic Pool- 16 years Aragon, Spain

General County Council of Aragon

"We would like to express you our great satisfaction for results we had got after installation of the ECOsmarte® System in our Olympic pool on November 2000. That had influence in a drastic reduction of chemicals (We consumed more than 66 gal. Sodium hypochlorite a day and only 6 gal. now) and additionally an exceptional water quality, what merit us, congratulations from Water polo National Team (World Champion Team, nowadays) that opened this sportive installation and different teams participating in past King Cup Championship celebrated in our pool, because they considered the system free swimmers from inconvenient atmosphere created by chloramine-charged water, getting a reduction of tiredness and a higher sport productivity of each player. All of them considered that our pool is a model of treatment water and its conditions are excellent, breathing very well, and no irritation has to be suffered."

"With ECOsmarte® we can state now, we have got higher physic-chemical, bacteriological and organoleptical water quality."

Antonio Cesar Ronchel
Executive Chief Sportive Park, Ebro River
May, 2002



Note: Better swimming times have been reported.

High School Pool- 10 years Golden Bay, New Zealand

I checked the pool today and it is running beautifully and as clear as a bell, everything running very steady. One of the people in charge of the pool monitoring told me he is extremely impressed at how little chlorine is needed to keep the levels between 0.5 ppm to 1.0 ppm with an average chlorine reading of 0.5017857 ppm over a two week period.

They have cut their chlorine consumption by a huge amount: I will be able to get an exact figure over a longer period than 2 weeks but just in comparison: they used to use one drum of mixed chlorine every few days now their present drum $\frac{3}{4}$ full after three weeks of use so it will be interesting to see how long this drum will last at this rate.

Brad

Natural Water Care Naturally
September, 2006

150,000 Gallons

Installed 2005

150 Swims Per Day



Private Club Pool- 10 years Topsham, UK

As it is now almost four months since you installed the ECOsmarte[®] system at Topsham Pool, and we are nearly at the end of our season, I thought now is a good time to update you on our progress so far.

We are delighted with the result. The water is really crystal clear and a joy to swim in and is just like swimming in bottled water - no more complaints of stinging eyes or costumes losing their colour. In fact we have not had a single complaint about the pool water this year.

As you know, we are a privately owned 25 x 10 metre pool open to the general public. Since you installed ECOsmarte[®] we have had approximately 35,000 swimmers to the pool and it is amazing the number of people that have commented on the quality of the water. The most asked question is "How do you manage to keep your pool water so good?" One couple told me that they had travelled all over the world and had never had a swim in pool water so good.

At our busiest time, on a good sunny day when the pool is crowded all day, the water quality stays the same. We don't have the cloudy effect after a heavy bathing load that we used to get when dosing with chlorine.

I would just add that all the committee are more than pleased with the results of ECOsmarte[®] it was money very well spent. I would have no hesitation in recommending ECOsmarte[®] in any future installations.

Kind Regards,
Cyril Harrison, President
Topsham Swimming Pool
United Kingdom



25 Meter Community Pool Highland Park, NY

Our water has never looked so clear or gotten so many compliments from our 300 to 400 daily swimmers. We are running 1.0 FREE chlorine, 4ppm copper and the Glasspack®.

Bob Watten
on



335,000 Gallons
Installed 2009
350 Swims Per Day

The Highland Park Community Pool is running six ECOsmarte® Programmable Pool controllers with Carbon Dioxide pH control along with the recently certified NSF 50 Glasspack® [filter media](#) on its sand filters. Pool operators report the highest clarity level in 14 years. The pool is 335,000 gallons and swims 300 to 400 people per day.



Regulatory Standards We Have Worked With

EU STANDARDS	CANADIAN STANDARDS	AUSTRALIAN STANDARDS	US STANDARDS (Average)
.5ppm Free Chlorine .4ppm Copper 35 Liters Per Swimmer Per Day Water Exchange 7.0-7.2ph	.6ppm Free Chlorine .4ppm Copper 35 Liters Per Swimmer Per Day Water Exchange 7.0-7.2ph	.6ppm Free Chlorine .4ppm Copper 35 Liters Per Swimmer Per Day Water Exchange 7.0-7.2ph	1.0ppm Free Chlorine .4ppm Copper 25 Liters Per Swimmer Per Day Water Exchange 7.0-7.2ph
24/7 Circulation Total Chlorine 1.5 (Combinated) •Liquid Chlorine •Zero Cyanuric or Stabilizer •Sand or Glass Media Filter	24/7 Circulation Total Chlorine 1.5 (Combinated) •Liquid Chlorine •Zero Cyanuric or Stabilizer •Sand or Glass Media Filter	24/7 Circulation Total Chlorine 1.5 (Combinated) •Liquid Chlorine •Zero Cyanuric or Stabilizer •Sand or Glass Media Filter	24/7 Circulation Total Chlorine 5.0 (Combinated) •Liquid Chlorine •Zero Cyanuric or Stabilizer •Sand or Glass Media Filter

ECOsmarte® Chemsaver® is the only alternative sanitizer device registered with the U.S. EPA, Health Canada, and The Australian APVMA.

US EPA	HEALTH CANADA	APVMA
EPA REG 083498-MN-001 Since 1995	PCP #30976 Since 2013	APVMA 82244/105272 Since 2004

Appendix A

ECOsmarte® Commercial Pools Overview



Maldives



COMMERCIAL POOLS OVERVIEW

- 10,000 gallon to 750,000 gallon (50M) Commercial Pools
- Datasheet Glass Media Filtration
- FAQ Commercial Pools
- Testimonials Commercial Pools



www.ecosmarte.com | www.glasspackfilter.com | (612) 866-1200
1600 E 78th Street Richfield, MN 55423 | I-494 at MSP Airport, Mall of America Exit



Yucatan, Mexico



Pool Size
85,000 Gallons
150 Person Bather Load

85,000 Gallon Commercial Pool.

Equipment

- **2 Programmable Pool Systems**

- With Carbon Dioxide pH Control
- A 6 watt DC voltage controller that energizes only when water is flowing by communicating to the ECOsmarte Anode Chamber, shifting between oxygen and ionization as needed daily or weekly.



- **4 ECOsmarte Copper/Oxygen Anode Chambers**

- One pair of self sacrificing copper plates to generate low level .4ppm to .7ppm copper to travel in the water killing bacteria and algae.
- One pair of titanium/platinum anodes to generate O2 oxygen. The oxygen eliminates uric acid, oils and other organics.



Must be obtained Locally (Low Pressure Tanks too)

- **2 CO2 Injection Valves**

- Automates pH control and eliminates 90% of acid use (50lb cylinder or low pressure holding tanks).



- **Glasspack® Filter Media**

- 1,200 - 2,400 pounds (or existing silica sand)



- **Recommended Equipment:**

- TWO Pentair TR 140 Sand Filters (Minimum)**

- 2" High Rate Backwash Valve

- TWO Pentair IntelliFlo Pumps (Minimum)**

- 3 Horse Power, Variable Speeds



Glass Pack®

- 6 Days Per Week Support
612-866-1200

- 7 Days Per Week Online Support

- 5 Year Warranty
Non-Pro Rated

- Copper & Titanium Bar Replacement
Copper Every Year - \$175 per set
Titanium Every 3rd Year - \$399 per set

Use the Interactive
Phone APP to
Train Personnel.
Now Available





Pool Size
133,500 Gallons
10M
350 Person Bather Load

10 Meter (133,500 Gallons) Commercial Pool.

Equipment

- **4 Programmable Pool Systems**

- With Carbon Dioxide pH Control
- A 6 watt DC voltage controller that energizes only when water is flowing by communicating to the ECOsmarte Anode Chamber, shifting between oxygen and ionization as needed daily or weekly.



- **8 ECOsmarte Copper/Oxygen Anode Chambers**

- One pair of self sacrificing copper plates to generate low level .4ppm to .7ppm copper to travel in the water killing bacteria and algae.
- One pair of titanium/platinum anodes to generate O2 oxygen. The oxygen eliminates uric acid, oils and other organics.



Must be obtained locally
(Low Pressure Tanks too)

- **4 CO2 Injection Valves**

- Automates pH control and eliminates 90% of acid use. (50lb cylinder or low pressure holding tanks).



- **Glasspack® Filter Media**

- 6,000 - 12,000 pounds
(or existing silica sand)



Glass Pack®

Filters 2 to 5 Microns which includes Bacteria & Skin Cells on the First Filter Pass.

- | | |
|---|---|
| • 6 Days Per Week Support
612-866-1200 | • 7 Days Per Week Online Support |
| • 5 Year Warranty
Non-Pro Rated | • Copper & Titanium Bar Replacement
Copper Every Year - \$175 per set
Titanium Every 3rd Year - \$399 per set |

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Now Available





Pool Size
337,500 Gallons
25M
750 Person Bather Load

25 Meter (337,500 Gallons) Commercial Pool.

Equipment

- **6 Programmable Pool Systems**
 - With Carbon Dioxide pH Control
 - A 6 watt DC voltage controller that energizes only when water is flowing by communicating to the ECOsmarte Anode Chamber, shifting between oxygen and ionization as needed daily or weekly.
- **12 ECOsmarte Copper/Oxygen Anode Chambers**
 - One pair of self sacrificing copper plates to generate low level .4ppm to .7ppm copper to travel in the water killing bacteria and algae.
 - One pair of titanium/platinum anodes to generate O2 oxygen. The oxygen eliminates uric acid, oils and other organics.
- **6 CO2 Injection Valves**
 - Automates pH control and eliminates 90% of acid use (50lb cylinder or low pressure holding tanks).
- **Glasspack® Filter Media**
 - 20,000 pounds (or existing silica sand)



Must be obtained Locally (Low Pressure Tanks too)



Glass Pack®

Filters 2 to 5 Microns which includes Bacteria & Skin Cells on the First Filter Pass.

- | | |
|---|---|
| • 6 Days Per Week Support
612-866-1200 | • 7 Days Per Week Online Support |
| • 5 Year Warranty
Non-Pro Rated | • Copper & Titanium Bar Replacement
Copper Every Year - \$175 per set
Titanium Every 3rd Year - \$399 per set |

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Now Available





Pool Size
750,000 Gallons
50M
1,500 Person Bather Load

50 Meter (750,000 Gallons) Commercial Pool.

Equipment

- **6 Programmable Pool Systems**

- With Carbon Dioxide pH Control
- A 6 watt DC voltage controller that energizes only when water is flowing by communicating to the ECOsmarte Anode Chamber, shifting between oxygen and ionization as needed daily or weekly.



- **12 ECOsmarte Copper/Oxygen Anode Chambers**

- One pair of self sacrificing copper plates to generate low level .4ppm to .7ppm copper to travel in the water killing bacteria and algae.
- One pair of titanium/platinum anodes to generate O2 oxygen. The oxygen eliminates uric acid, oils and other organics.



- **6 CO2 Injection Valves**

- Automates pH control and eliminates 90% of acid use (50lb cylinder or low pressure holding tanks).



- **Glasspack® Filter Media**

- 39,000 pounds
(or existing silica sand)



Glass Pack®

Filters 2 to 5 Microns which includes Bacteria & Skin Cells on the First Filter Pass.

- | | |
|---|---|
| • 6 Days Per Week Support
612-866-1200 | • 7 Days Per Week Online Support |
| • 5 Year Warranty
Non-Pro Rated | • Copper & Titanium Bar Replacement
Copper Every Year - \$175 per set
Titanium Every 3rd Year - \$399 per set |

www.ecosmarte.com/publicpools.html • www.glasspackfilter.com
(See Madrid and Zaragosa - Testimonials 2001-2015)

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DATA SHEETS

Glass at a Glance

Characteristic	Glass	Zeolite	Sand
Environmentally Sound	•		
Long Lasting (3x longer)	•		
Ionically Charged (Traps small particles)	•		
Removes twice the Iron and Manganese	•		
Self-sterilizing	•		
Reduced chemical use	•		
Less likely to block or channel	•		
Requires salt bath		•	
Requires more chemicals		•	•
Class II Carcinogen		•	•
Harmful to breathe		•	•
Surface houses bacteria		•	•
Strip mined: depletes our environment		•	•
Requires more water for backwash		•	•

Glass Pack®

Conventional Sand Filter
and Pump



Pea Gravel Base
Required Over Laterals.

Glasspack® Technical Data

Specific Gravity: 2.50	Porosity: Typically 48%
Bulk Density: 75lbs/cu.ft.	Shape: Angular to sub-angular
Effective Size: Ranges from 0.30 to 1.10mm	Permeability: Typically 4.0 X 10 ⁻¹ cm/sec
Coefficient of Uniformity: Ranges from 1.45 to 1.80	Physical Composition: Amorphous Soda-lime glass
Estimated Sphericity: Approximately 0.40	NO BACKWASH 400 Pool Builders used Glasspack® in 2015 AT STARTUP



NEW 40% PRICE REDUCTION

ONLY GLASSPACK® IS 100% POST CONSUMER WASTE.
Recycled, Machined like Sugar & Sterilized.

Glasspack backwashes 1/4 as much as quartz silica sand
while delivering 2 to 5 micron filtration.

www.glasspackfilter.com



FAQ - Why ECOsmarte with liquid chlorine in a commercial pool?

Q: What's the point of ECOsmarte in a commercial pool if chlorine is regulated and required?

A: The true issue of using chlorine in a pool as the sole sanitizer is the formation and presence of chloramines, a chemical that forms from the reaction of free chlorine atoms and organic matter. It is this chemical that causes eyes to become irritated, and for the pool to give off the chlorine smell. Using liquid chlorine in a commercial pool with ECOsmarte does not allow these chloramine molecules to form.

Q: Why do chloramine molecules form in chlorine pools but not in commercial ECOsmarte pools?

A: There are 3 key reasons why ECOsmarte prevents chloramine formation. The most important reason the constant oxidation your pool receives while sanitized by ECOsmarte. ECOsmarte's active oxidation raises the dissolved oxygen levels and eliminates ammonia and chloramine. This does not occur in chlorine pools as chlorine is the oxidizer, and so no excess oxygen is present to prevent the formation of chloramine. The second reason why chloramine does not form in commercial ECOsmarte pools is the significantly smaller quantity of liquid chlorine needed as the copper is also taking part of the sanitizing work. The third and last reason why chloramine does not form is because in neutral pH environments, NH_4^+ forms instead of NH_3 , and cannot react further, preventing the formation of chloramine. Formation of Chloramine: $\text{OCl}^- + \text{NH}_3 \rightleftharpoons \text{NH}_2\text{Cl} + \text{OH}^-$

Q: Can I use solid chlorine instead of liquid chlorine in my commercial ECOsmarte pool?

A: No, the use of solid chlorine will also require the use of a stabilizer known as cyanuric acid, a conditioner that is used to prevent the loss of chlorine from UV rays and heat. However, as liquid chlorine can avoid the need for cyanuric acid, it is recommended to simply use liquid chlorine. Cyanuric acid's cost can build up over time, and if too much is added then the sanitation power of the chlorine is lost. ECOsmarte has success in reducing chlorine levels by 50 to 80% with the ionic copper and dissolved oxygen.

Q: Won't the copper when used with chlorine stain the pool?

A: No more than chlorine alone. We will eliminate the brown and bleach staining that is common with chlorinated pools. Many ECOsmarte indoor commercial pools will no longer require sand blasting the walls to eliminate chlorine compounds.

Q: What is the maintenance cost of an ECOsmarte commercial pool?

A: Three main components must be replaced over time. Copper plates must be replaced sometime between three months and one year at a cost of \$179. Titanium-platinum plates must be replaced between one and three years at a cost of \$499. CO2 injection solenoids must be replaced between one and three years at a cost of \$110 each.

ECOSMARTE COMMERCIAL POOL TESTIMONIALS

Aragon, Spain: European Union Training Pool - General County Council of Aragon / 50 Meter

"We would like to express you our great satisfaction for results we had got after installation of the ECOsmarte System in our Olympic pool on November 2000. That had influence in a drastic reduction of chemicals (We consumed more than 66 gal. Sodium Hypochlorite a day and only 6 gal. now) and additionally an exceptional water quality, what merit us, congratulations from Waterpolo National Team (World Champion Team, nowadays) that opened this sportive installation and different teams participating in past King Cup Championship celebrated in our pool, because they considered the system free swimmers from inconvenient atmosphere created by chloramine-charged water, getting a reduction of tiredness and a higher sport productivity of each player. All of them considered that our pool is a model of treatment water and its conditions are excellent, breathing very well, and no irritation has to be suffered."

"With ECOsmarte we can state now, we have got higher physic-chemical, bacteriological and organoleptical water quality."

Antonio Cesar Ronchel
Executive: Chief Sportive Park, Ebro River
May, 2002

UPDATE: 2014 Site Replaces Cells, Controllers Still Performing - Starfish Aqua



Highland Park, New York 2011 - 335,000 Gallons / 25 Meter

Our water has never looked so clear or gotten so many compliments from our 300 to 400 daily swimmers. We are running 1.0 FREE chlorine, 4ppm copper and the Glasspark®.

Bob Watts
Binghamton, NY



<http://ecosmarte.com/publicpools.html>
(612) 866-1200





Pool Size
10,000 to 50,000 Gallons
75 Person Bather Load

10,000 to 50,000 Gallon Commercial Pool.

Equipment

• 1 Programmable Pool System

- With Carbon Dioxide pH Control
- A 6 watt DC voltage controller that energizes only when water is flowing by communicating to the ECOsmart Anode Chamber, shifting between oxygen and ionization as needed daily or weekly.



• 2 ECOsmart Copper/Oxygen Anode Chambers

- One pair of self sacrificing copper plates to generate low level .4ppm to .7ppm copper to travel in the water killing bacteria and algae.
- One pair of titanium/platinum anodes to generate O2 oxygen. The oxygen eliminates uric acid, oils and other organics.



Must be obtained Locally (Low Pressure Tanks too)

• 1 CO2 Injection Valve

- Automates pH control and eliminates 90% of acid use (50lb cylinder or low pressure holding tanks).



• Glasspack® Filter Media

- 900-1,200 pounds (or existing silica sand)



• Recommended Equipment:

Pentair TR 140 Sand Filter (or Two Pentair TA 100 Filters)

- 2" High Rate Backwash Valve

Pentair IntelliFlo Pump

- 3 Horse Power, Variable Speeds

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