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Water System Green Technologies



Why we need to preserve the environment cannot be put in better words than those of Qatar Green Building Council: *"We don't inherit the environment from our fathers, we borrow it to give to our children."*

Abstract

Akiki Engineering's motivation behind this article is to encourage the use among consultants of environment-friendly technologies. In this article, we introduce "Green" technology, why we need it, and where such technology fits. We present maximum flow rates required to qualify you as "green" and specific products that serve each purpose, always under the umbrella of environmental friendliness. Finally, we conclude with calculations of cost savings attainable by green technology.

Keywords: green technology, green buildings, environment, water softening media, flush valves, urinals, flow rate

I. Introduction

"Green Technology" is usually linked to: solar hot water, wind power, CO₂ emissions, electric cars... The US Green Buildings Council defines it as: *"Green has become the shorthand term for the concept of sustainable development as applied to the building industry. Also known as High-performance buildings, green buildings are intended to be environmentally responsible, economically profitable, and healthy places to work."* (Reference Guide October 2006)

The question is How? Humans have already proved that their collective efforts can cause world imbalances (e.g. financial crises, global warming). However, today we understand that the responsibility for preserving balance in any system, including the natural system, trickles down from the governmental level to the individuals level. Public and private sectors should work together, iteratively, to succeed at promoting Green Buildings. In this article we focus on Clean Water Treatment Technology as a subcategory of Green Buildings construction.

Governments, with the aid of engineers, set up design standards and specifications for the properties of water. Engineers build systems that meet those standards. They also improve current technologies so as to either achieve the governmental specifications more efficiently or to achieve specifications well beyond the minimum requirements set by the governments.

The Leadership in Energy and Environmental Design (LEED) is a Green Building points-based rating system. Its use can serve as a design standard for engineers and architects to achieve LEED certification that their buildings are indeed



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environmental friendly and Green. One example is the Nokia China Campus, the water use of which is 37% below comparable buildings.

At **Akiki Engineering** we focus on providing water and waste water treatment materials and systems, during the proposal and construction phase, that are of highest quality *and* most recent technology. Our business line is all about protecting and preserving the most critical resource to life: **Water**. In such a business, compromise today comes back to haunt us at a bigger cost tomorrow, to be carried by our future generations.

In the water treatment industry, latest technologies can achieve environmental friendliness by reducing/replacing:

- salt usage in water softening
- electricity usage in flush valves controllers
- unnecessary water consumption in urinal flushing systems

In the following sections we shall tackle each of the three points above.

II. Salt

Water softening units are installed in apartments, buildings, hospitals, schools, universities. They reduce the hardness of water: Calcium and Magnesium. Water hardness is undesirable because it inhibits the effectiveness of soap, it is behind scale precipitation in pipes, and causes corrosion.

Water softeners operate by passing the water through a bed of resin, which replaces the calcium and magnesium with salt. The water softener can then be appended with a reverse osmosis system, to reduce the salt.

The Achilles' heels of water softeners, despite their many uses, are the **brine water discharge** and the **backwash** steps in their operation. In a world conserving water resources, such conventional water softening technologies are challenged.



Fortunately, a substitute is available: salt-free **E-Treat™ water conditioning system** by Alamo.

The system combines two technologies to achieve water softening without salt:

1. *Granular activated carbon* to remove chlorine, tastes, odors and organics from your water for whole house treatment
2. *E-Treat™ Anti-Scale Media* to modify Calcium and Magnesium, so scale formation is virtually eliminated

The E-Treat™ system can save

- 300 kgs of salt per year (no salt)
- 23,000 L of water (no backwash)
- Electricity (no electric controller)



Zurn has brought into the market several products that can help you attain LEED certification for your buildings.

II. Electricity

Zurn HydroVantage ZGEN6200EV Flush Valve

Operated by Zurn 4.0 Sensor Technology™, and powered by a self sustaining hydro generator which creates electrical energy with each activation and stores it in a rechargeable energy cell. The hydro generator, energy cell, and a back-up battery combine for a self-sustaining system for approximately 10+ years.



The valve incorporates *Zurn Environmental Trending Technology* which continually monitors light and usage levels to maximize power savings. The valve is furnished with

a true manual override button, filtered piston operator, high pressure vacuum breaker, vandal resistant stop cap, sweat solder kit, cast wall flange with set screw and stop valve with antisiphon back check feature. All gaskets and seals are chemical and chloramine resistant for extended life.

III. Water Consumption

To save on unnecessary water disposal, Zurn introduced two Urinals technologies:

Zurn Ultra Low Flow “Pint” Urinal

Zurn Commercial Brass 1/8 Gallon Urinal - Z5798

Zurn’s new Z5798 1/8 Gallon Urinal is a marvel of water saving efficiency that provides an 88% savings of water over the standard 1.0 gallon urinal or 75% savings of water over the 0.5 gallon urinals in use today.



Zurn Waterless Urinal

Zurn Commercial Brass Z5795

The Z5795 waterless urinal is a wall-hung vitreous china urinal with integral trap and drain line connection. The Zurn green sealant used maintains a sanitary, environmentally friendly and odor free installation.



IV. Baseline Flowrate Standards

In the US, all fixtures manufactured should restrict maximum flow rates identified below.

Fixture	Maximum Flow Rate
Toilets	1.6 GPF
Urinals	1.0 GPF
Shower Heads	2.5 GPM @ 80 PSI; 2.2 GPM @ 60 PSI
Faucets - Commercial	0.5 GPM @ 60 PSI
Faucets - Standard	2.2 GPM @ 60 PSI
Metering Faucets	0.25 GPC @ 80 PSI

GPF = gallons per flush; GPM = gallons per minute;
 PSI = pounds per square inch, GPC = Gallons Per Cycle



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V. Water Conservation Revolution With Zurn EcoVantage® Products

How Zurn Can Save You Water and Money Easily

Urinals - 1.0, 1.5, 3.0 GPF When a facility replaces or retrofits its existing urinals with 1/8 GPF, waterless urinals or 0.5 GPF flush valve diaphragm kits in pre-existing urinals, they can save up to almost 90% water over their standard urinal fixtures.

Toilets - 1.6 GPF When a facility replaces or retrofits its existing 1.6 GPF toilets with 1.28 or 1.0 GPF EcoVantage toilets, their average savings can reach 20% to almost 40% savings over standard toilet fixtures. If an existing building still uses 3.5 GPF fixtures, these savings can exceed 70%.

Faucet Aerators When a facility replaces or retrofits its existing faucet aerators with 0.5 GPM or 1.0 GPM aerators, they can swiftly save over 50% to 75% of their water use over the current 2.2 GPM standard aerator faucets.

Faucets When a facility replaces or retrofits its existing manual faucets with low-flow consumption metering faucets or low-flow sensor consumption faucets, not only will the facility see immediate water savings, but the overall cleanliness of the restroom will increase.

Flush Valves Installing sensor retrofit kits on a facility's manual flush valves or even installing dual-flush handles or HET diaphragms are great ways to save water and money. Sensor Flush Valves have evolved so they can be easily retrofitted onto your existing valves for enhanced cleanliness and provide consistent water conservation. **Dual-flush** handles give the user the power to save water and gives them a sense of contribution.

Food Services Replacing existing pre-rinse devices with a 1.24 GPM @ 60 PSI pre-rinse unit for **Pre-Rinse Devices** commercial kitchen sinks is an impressive water saver. Most standard pre-rinse units use between 2 and 6 gallon per minute at 60 PSI.

What the Savings Mean With Zurn EcoVantage Products



Zurn 1.28 EcoVantage® Closets Water and Cost Savings

Industry statistics say the average water closet uses
1.6 gallon - 43,200 gallons
3.5 gallon - 94,500 gallons

Average cost of water:
\$7.00/1,000 gallons

Closet cost per year:
1.6 gallons = \$302.00/year
3.5 gallons = \$662.00/year

Average yearly cost of Zurn 1.28 EcoVantage Closet:
2250 flushes x 12 months x 1.28 gallons = 34,600 gallons

34,600/1,000 x \$7.00 = \$242.20/year
Average yearly savings with the Zurn 1.28 EcoVantage

Cost Savings \$\$\$

Vs. 1.6 gallon = \$60.00
Vs. 3.5 gallon = \$420.00

Water Savings

8,600 gallons
60,000 gallons

Zurn 1/8 Gallon Urinal Z5798 Water and Cost Savings

Industry statistics say the average urinal uses per year:

1.0 gallon - 27,000 gallons
1.5 gallon - 40,000 gallons
3.0 gallon - 81,000 gallons

Average cost of water:
\$7.00/1,000 gallons

Watered urinal cost per year:
1.0 gallon - \$189.00/year
1.5 gallon - \$283.50/year
3.0 gallon - \$562.00/year

Average yearly cost of Zurn Z5798 1/8 gallon urinal:
2250 flushes x 12 mnths x .125 gallons = 3375 gallons
3375/1,000 x \$7.00 = \$ 23.63/year

Average yearly savings with the Zurn 1/8 gallon urinal:

Cost Savings \$\$\$

Vs. 1.0 gallon - \$165.00
Vs. 1.5 gallon - \$260.00
Vs. 3.0 gallon - \$543.00

Water Savings

24,000 gallons
37,000 gallons
78,000 gallons

Water/Cost Savings Analysis: Urinals

Compared to This Type of Urinal	Cost Savings Per Year to Use 1/8 Gallon	Water Savings Per Year to Use 1/8 Gallon
1.0 Gallon	\$165.00	23,600 gallons
1.5 Gallon	\$ 259.87	37,125 gallons
3.0 Gallon	\$ 542.37	77,625 gallons



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References

The following documents are made available at <http://www.akikieng.com/cache> to provide further details:

Zurn LEED Guide 2009

Zurn Ecovantage and Hydrovantage Series

Watts E-Treat: Anti-Scale Media and System



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