



....a dialogue for California's water conservation community

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**Sponsored by the California Urban Water Conservation Council**

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## **This issue.....**

- **New Products Shown at KBIS...**  
The GOOD news...more dual-flush toilet fixtures will be making it to the marketplace and American Standard introduces a new toilet directed specifically at the concerns of water conservation professionals! The BAD news...more and more manufacturers are introducing multiple showerhead systems for the home, many producing flow rates in excess of 12 gallons per minute!
- **The T5 Flushmeter finally debuts....**  
Using the T5 to measure flush volumes on installed toilet fixtures is a simple operation.
- **An Innovative Approach to Toilet Fixture Distribution by San Jose...**  
The City of San Jose and Niagara Conservation link up to implement one of the most innovative approaches to toilet replacement.
- **Some Toilet Fixture Prices Going Up**  
Transportation costs are rising and the effects will be felt here.
- **Update to the Los Angeles SPS Announced**  
The Los Angeles Department of Water and Power (LADWP) announces some very important changes to their Supplementary Purchase Specification for residential toilet fixtures.

- **Los Angeles Increases Toilet Rebates for CII Replacements**  
LADWP bumps the CII toilet rebates to new highs!
  - **Free-Rider Study Released**  
The CUWCC releases comprehensive study of program freeridership in California.
  - **Dual-flush Toilet Fixture Standard Amended**  
The change advocated by water conservation professionals was approved.
  - **Follow-on Testing of Toilet Fixtures and Flappers in Canada**  
Work has begun on the follow-on to the work done at the National Association of Home Builders Research Center.
  - **Pre-Rinse Spray Valve Replacement Program...on track and saving water!**  
The PRSV program continues on its track toward 16,900 replacements by December 2003.
  - **Weather-Based Irrigation Control: The ET controller has arrived!**  
Exploring the new opportunities for high-tech water efficiency in the landscape sector.
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## **1. New Products at the Kitchen and Bath Industry Show (KBIS)**

Among the many thousands of products shown at this annual event (this year in Orlando), there were a number that address water-efficiency in the home...and some that don't! Of course, the proliferation at this excellent show of energy- and water-efficient clothes washers and dishwashers means that we'll see many new machines in our California marketplace.

### **The "Luxury Showering Experience"**

While some manufacturers focused upon specialty items such as automatic water shut-off devices and valves designed to save water, numerous others were showing their versions of water-wasting showerheads and luxury shower systems for the bathroom. Twelve-inch diameter showerheads (naturally they are called something more glamorous than a "showerhead") flowing in excess of 12 gallons per minute, as well as expensive multiple-head shower systems that attack you from all angles, easily consume all of the water saved in the home by the efficient toilets and clothes washers.

### **More Dual-Flush Toilet Fixtures**

At the same time, at least three manufacturers unveiled their new dual-flush toilet fixtures. Unlike the Caroma products, these dual-flush toilets employ siphonic bowls, rather than the wash-down style found in Europe and Australia. Expect to see these toilets being offered at competitive prices before the end of 2003.

## **The New American Standard Champion**

Finally, American Standard displayed its new Champion two-piece toilet. This fixture incorporates features that the water conservation folks have been looking for: non-adjustable tank trim that eliminates the ability to tamper with the flush volume, a new flush valve that removes the “hold down” feature that can increase flush volume, and a large trapway diameter. In addition, the toilet features a 3-inch diameter flush valve (similar to many Toto fixtures), an “elevated” flush valve for more head pressure, and completely redesigned bowl hydraulics that will likely improve flush performance. To be available in June 2003; pricing not revealed, but expect that it will compete with the Toto Drake on performance but at a lower price point.

## **2. The T5 Flushmeter is now available**

The new T5 Flushmeter (production version) has been available for several months and is proving itself to be everything that it was touted to be (see WaterLogue, Vol.2, No. 1). This time-saving instrument is ideal for the accurate and fast measurement of the flush volumes on installed toilet fixtures (gravity fed fixtures only, however...the current model should not be used on pressure-assist or flushometer valve fixtures).

The T5 is best suited to in-residence water use surveys and audits where the auditor is required to determine the flush volume of the installed toilet. The instrument’s accuracy is to within  $\pm 0.1$  liters---and the measurement can be done in much less than 1 minute! This is accomplished without disconnecting the water source (to attach a meter) or attempting to measure tank volume.

Our new T5 was taken to the IAPMO testing laboratory here in southern California, where they checked it out and confirmed it to be as accurate as claimed. They strongly recommended it for field measurements, since it is portable, accurate, and fast.

Anyone involved in field measuring or otherwise verifying flush volumes should consider this instrument. For further information, check the Strategic Instruments website at:

<http://www.t5flushmeter.com/>

For your questions on price, delivery and performance, contact Bill Gauley directly at:

[bgauley@t5flushmeter.com](mailto:bgauley@t5flushmeter.com)

## **3. San Jose’s Innovation is a Program Success...**

The City of San Jose’s Water Efficiency Program has distributed over 2,000 Niagara Flapperless toilet fixtures to residential customers through a unique program using FedEx as the warehousing and delivery agent. This negates the need to have participants attend distribution events.

The City is contacting approximately 75,000 households by mail to solicit interest in receiving a free toilet. Customers express interest by mailing a completed application form to the City. Upon receipt of the necessary paperwork and approval by staff, a packet is mailed to the customer. Delivery of a new Flapperless toilet (including all the required installation hardware) is arranged with Niagara Conservation Corp. The process takes a total of four to six weeks from the receipt of the application to the arrival of the toilet at the customer's home.

On the other end, containers of toilets arrive in the Port of San Francisco and the toilets are transported to the FedEx warehouse in San Jose. FedEx personnel work with the Niagara Conservation Corp. staff to arrange FedEx deliveries of the toilets to the customers' residences as part of their normal delivery routine. Customer signatures are required upon delivery of the toilet. Customers are also required to take their old toilet to a nearby recycling center.

Overall, this new approach to toilet distribution has gone very smoothly with a few areas that could use some fine-tuning. Limitations exist as to what kind of information can be obtained and how it is given to the City from the courier service, specifically, tracking and proof of delivery information.

Participants are receiving the program enthusiastically, and appreciate not having to devote a Saturday morning to picking up a toilet at a local high school.

Check this website for program outreach: <http://www.slowtheflow.com/toilet-about.htm>

For further information, contact Brian Lee at the City:

Mr. Brian Lee, Project Lead  
408-277-8416  
[Brian.Lee@ci.sj.ca.us](mailto:Brian.Lee@ci.sj.ca.us)

Or, contact Bill Cutler at Niagara Conservation:

800-831-8383, ext. 137  
[billc@niagaraconservation.com](mailto:billc@niagaraconservation.com)

#### **4. Some Toilet Prices May Increase...Significantly!**

Expected increases in Trans-Pacific shipping costs could amount to over \$500 per container (a container holds 400 to 500 toilet fixtures), or \$1.00 per toilet fixture. In addition, possible new surcharges at Pacific Coast ports may add an equal amount to the costs per fixture. Some of the manufacturers that have moved production (from the U.S. or Mexico) to China, Thailand, Indonesia and elsewhere in Asia may be bearing the increased costs for products brought into North America and passing those costs along to their distributors. For example, an increase of \$2.00 or more in the landed cost of the commodity toilets could amount eventually to as much as a 5 to 10 percent cost increase to water agencies and consumers.

## 5. Los Angeles Tightens the Requirements of its Supplementary Purchase Specification (SPS)

The Los Angeles Department of Water and Power has announced that, in accordance with its original plan, the Department is reducing the maximum volumes specified in Section III of its SPS to 2.0 gallons from its current 2.4 gallons. The new requirement becomes effective on July 1, 2003. According to the International Association of Plumbing and Mechanical Officials (IAPMO), 17 toilet fixtures already comply with this requirement.

The SPS qualifies only those fixtures that meet stringent requirements relating to flappers and flush volume adjustability. It has been successfully applied to Los Angeles' toilet fixture purchases since mid-2000.

To view the specification, download "SPS-ULFT Requirements" from:

[http://www.cuwcc.org/products\\_tech.lasso](http://www.cuwcc.org/products_tech.lasso)

## 6. Los Angeles Increases Toilet Fixture Rebates for CII Retrofits

The Los Angeles Department of Water and Power announced that, effective immediately, rebates available for the replacement of high-volume toilet fixtures in commercial, institutional, and industrial facilities within the city are being increased to:

- \$175 for gravity-fed and pressure-assist tank-type toilets
- \$250 for flushometer valve toilets

## 7. Freeridership in ULF Toilet Programs - Study Report Released

The CUWCC recently released the first comprehensive study report on freeridership in agency-sponsored toilet fixture replacement programs in California. (**NOTE:** Freeriders are defined as program participants who, without the toilet program, would still have replaced their toilets. Therefore, agencies do not get the conservation benefits from serving freeriders because the conservation would have occurred irrespective of the program.)

This study examines several mature ULFT programs and considers the costs and loss of benefits associated with freeridership. It included a series of telephone and mail surveys of past participants in three common types of toilet replacement programs:

- Rebate programs,
- Voucher programs, and
- Free distribution programs.

Rebate programs experienced the highest rate of freeridership while the free distribution programs were the lowest. Fully detailed study results may be found in the final report, which may be ordered from the CUWCC for \$25 by going to:

<http://www.cuwcc.com/publications/>

It is very important to note, however, that the programs examined in the study were “mature” programs – that is, they had been in existence for many years before the study began. None of the data included new programs just beginning or programs with three or less years of operation. Thus, the results may not be applicable to new toilet replacement programs.

## **8. Change to the Dual Flush Toilet Fixture Standard**

Last year (WaterLogue Vol. 2, No. 2), we reported to you on the situation with the need to amend the A112.19.14 standard for dual flush toilet fixtures in order to encourage the North American marketplace to offer more dual-flush fixtures. In early 2003, the standards committee approved the change proposed by industry and supported by the CUWCC.

## **9. Follow-on Toilet Fixture and Flapper Testing Now Underway...**

We reported extensively in the last issue (WaterLogue Vol. 2, No. 3) on the new round of toilet testing that was about to get underway in Canada. This fixture test program has been designed as a follow-on to the work completed in 2002 by the National Association of Home Builders Research Center in Maryland. The follow-on testing in Canada began several months ago and results are expected to be reported by July 2003.

A total of 53 different toilet fixture modes are now included in the test program, each being subjected to a new testing protocol that includes the use of soybean paste as a test media. Fixtures are being added to the test program as more water providers become co-sponsors of the effort.

The second element of the test program has also been expanded. This element is designed to determine the specific “dial-in” setting for the Fluidmaster 502 Bull’s Eye<sup>®</sup>

Adjust-a-Flush<sup>™</sup> after-market replacement flapper that will maintain the original 1.6-gallons per flush (gpf) on each of these toilet fixtures. Two more adjustable flappers (from Niagara Conservation and Frugal Flush) have recently been added to the program and will likewise be subjected to the same protocol.

For a more complete description of the test program and the current list of the 53 different fixtures to be tested, go to:

[http://www.cuwcc.org/products\\_tech.lasso](http://www.cuwcc.org/products_tech.lasso)

...and download the PDF documents titled “International Project” and “Toilet Fixture List.”

## **10. Pre-Rinse Spray Valve Replacement Program – 8,000 installs!**

The CUWCC’s Pre-Rinse Spray Valve Replacement Program is nearing the halfway mark. As of mid-May, approximately 8,000 new high-efficiency valves have been

installed in California food service operations since September 2002, saving an estimated 8,800 acre-feet of water. The Program goal is 16,900 installations by December 2003.

For a more complete description of the Program, consult WaterLogue Vol. 2, No. 3, or go to the Program website:

<http://www.cuwcc.org/sprayvalves.lasso>

For Program implementation information, contact Maureen Erbeznik:

[moerbeznik@attbi.com](mailto:moerbeznik@attbi.com)

For spray valve technical information, contact John Koeller: [koeller@earthlink.net](mailto:koeller@earthlink.net)

## **11. Weather Based Irrigation Control: The ET Controller Has Arrived! By Tom Ash**

In many states, landscape water use efficiency is becoming one of the most important features of water conservation programs. Poor landscape water use is directly related to urban runoff, peaking, and is contentious during drought periods. Saving water outside may be a more difficult task than saving inside, due to wide ranging variables. Finding a cost-effective, scientific-based solution is important for managing and stretching limited water supplies. For landscape water use efficiency, the irrigation controller that uses evapotranspiration data (ET)<sup>1</sup> has arrived, and not a minute too soon!

### **Background**

Is 2003 the year that the promise of real-time, “smart” irrigation control finally comes true? An ET controller workshop, hosted by the California Urban Water Conservation Council (CUWCC) in northern and southern California, indicates that the time has indeed arrived. At this well-attended workshop, eight (8) manufacturers displayed their controller products or conceptual plans for delivering real-time ET for both home and commercial applications. This is significant because it is a very strong indication that irrigation equipment manufacturers are gearing-up to meet a product and technology demand that water agencies in California suggest they will help create.

Why the interest or the need in ET controllers? For close to 15 years, water agencies have determined that many landscapes as being over-watered. The same over-watering has been measured in virtually every other state. Landscape over-watering seems to be the norm (see the AWWARF Residential End Use Study<sup>2</sup>).

Water agencies and municipalities provide a wide range of services to water users in hopes of bringing landscape water use under control. Those services include site water audits with recommendations and providing irrigation schedules to homeowners and landscape contractors. While there may have been some water use reductions, the

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<sup>1</sup> Evapotranspiration is the combined process of water loss by evaporation and water transfer to the air through plant tissues.

<sup>2</sup> Residential End Uses of Water, American Water Works Association Research Foundation, by Peter W. Mayer and William B. DeOreo et al, 1999.

water savings were always short-lived and the efforts could not be considered cost-effective for most agencies. What water agencies really need most are efficient, credible (scientific), adaptable (suited for every type of landscape condition) and, most importantly, consistent methods to ensure that the right amount of water is applied to landscapes. ET Controllers are on the way to the rescue.

### **Landscape Water Use Reduction**

Tests on ET Controller technology began in 1998 at the Irvine Ranch Water District. This agency utilizes real-time weather data from local weather stations to help determine customer water allocations. The agency could see and measure who and how much water was being wasted on every residential and commercial landscape account. The prospect of real-time, automated irrigation scheduling would be very important in helping customers to keep water use and water bills low.

The first study application of the technology was initiated at 40 homes with assistance from the MWD of Southern California (the full study report is available at [www.irwd.com](http://www.irwd.com)). The study demonstrated the following:

- Yielded an average savings of 37 gallons per day per home (on moderate water use landscapes, not considered high water users);
- Achieved 85% of the potential water to be saved (irrigation distribution systems were not upgraded);
- Improved the landscape appearance (as claimed by 97% of study participants); and
- Achieved high customer satisfaction for convenience (the participants never had to set or adjust irrigation schedules as the weather changed) on post-test surveys.

### **Urban Runoff Reduction**

A second (\$1 million) study, starting in 2001, was conducted with the U.S. Environmental Protection Agency, CALFED and other public agency support to measure the impact that ET Controller technology could have on reducing urban runoff. This study retrofitted 125 homes and 13 commercial landscape sites all located in the same micro-watershed (one storm drain outlet outfitted with flow monitoring devices) with an ET Controller technology.

The study findings showed that water was again saved (42 gallons average per home per day on moderate water using sites), landscapes were again healthy and attractive, and that runoff was significantly reduced (64 to 71 percent runoff reduction when comparing the ET Controller test area with three nearby control areas).

The demonstrated benefits of water savings (efficiency) and runoff reduction from the use of the ET Controller technology has prompted (1) other studies by agencies in different types of settings, (2) millions of dollars in California grants for the distribution of ET Controllers and (3) the increased production of ET Controller products.

As shown in the CUWCC ET Controller workshops, the choices for ET Controller products are wide and new products are emerging. The options are classified below:

Product Name	Real Time ET Technology?	Needs User Schedule?	Currently Available?
AquaConserve	No	Yes	Yes
ET Water Systems	Yes	Yes (service)	No - Conceptual
Hydropoint	Yes	No (controller system creates schedule)	Yes
Interactive Water Systems	Yes	Yes	No - Conceptual
Irrisoft	Yes	Yes	Yes
Micromet	Yes	Yes (service)	Yes
Rainbird	Unknown	Yes	Commercial only
Rain Master	Yes	Yes (service)	Commercial only
Water2Save	Yes	Yes (service)	Commercial only
WeatherSet	No (solar sensor)	Yes	Yes

### **Real Time ET**

The value of real-time ET is that with actual weather changes, irrigation schedules can be updated in real time for maximum plant health. In California and other states, the number of real-time weather station systems is being increased in recognition that accurate weather data is the foundation for efficient irrigation management. ET is described in detail on the website for the California Department of Water Resources at:

<http://www.cimis.water.ca.gov/>

Other methods to approximate ET, or ETo (local reference weather) are being designed into irrigation controllers. They include sensors that read/monitor one climate factor, i.e. temperature, humidity or solar radiation. These sensors do not measure ET, but attempt to mimic the movement of ET/weather. The jury is out on whether there is sufficient accuracy with interpolating single weather factors into actual ETo.

### **User Schedules**

The importance of “user schedules” can’t be stressed enough. For at least the past 15 years, universities and water purveyors have provided irrigation schedules to homeowners and landscapers. They have been provided to homeowners in water audit programs, in water bills, and at water conservation workshops, and have been based upon data from the Irrigation Association (IA) and from university scheduling criteria.

Providing efficient irrigation schedules does not appear to provide any lasting positive impact on water use, because irrigation scheduling needs to be performed on a consistent (at least weekly) basis. It is a sophisticated mathematical exercise and requires real-time weather data. It also requires extensive knowledge of the site (plants, soil, slope, sun, shade and the physical characteristics of the irrigation system). Most importantly, it requires people to “do the right things” to their irrigation controllers “over and over again” at the “right time”.

Therefore, any ability to automate the irrigation scheduling process from one of “guesswork” to one of “credible science” means a major step forward in water use efficiency.

### **Conclusions**

There is now a wide range of products that market “ET” irrigation control. The field is so new that most products have not been subject to independent and various field testing. Before venturing into this technology, we suggest that you look carefully at the products, test, evaluate, and choose wisely those products that you might offer to customers. Just as low-flow toilets gained an early reputation for not working well (a claim that has been hard to shed), the same could happen with ET controllers if products are not truly “smart”, rely too heavily on people, or are sold on remarkable claims of water savings. Remember, a landscape will only save water if it is being “over-watered”. (Determining if a landscape site is over-watered will be the subject of the next WaterLogue issue.)

For further information, contact:

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<p>To discuss any of the above or submit material for this WaterLogue newsletter, contact John Koeller at <a href="mailto:koeller@earthlink.net">koeller@earthlink.net</a></p>
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