



December 2000

Vol. 1, No. 2

A newsletter for California's water conservation community

Sponsored by the California Urban Water Conservation Council

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A message from the Executive Director:

While I fully understand the “compelling” interest that some of you may have in toilets, it is our desire that this newsletter play a much larger role in communicating the latest news on water conservation programs, studies, products, and trends.....not just toilets, but all of the other interesting work being undertaken in the interest of conserving water. Therefore, I am asking for your ideas and suggestions as to a permanent name for this newsletter, a moniker that reflects the larger scope of interest of our members. Send me your suggestions by January 31. Then, in February, 2001, we will select the winner and award a very special prize to that individual!

Mary Ann

P.S. If you would like to contribute an article or other information on a subject of interest, please let me know.

This month.....

1. Dual-flush toilets....do they really save more water?

Preliminary results from a study in Seattle shows that dual-flush toilet may provide additional water savings over conventional ULF toilets.

2. The University of Arizona Study of Aging Low Consumption Toilets

The study in Tucson indicates that older ULF toilets are still performing, but there are some concerns.

3. Progress on flapper durability standards

Manufacturers of flappers are working with the manufacturers of in-tank bowl cleaners to possibly bring a resolution to some of the flapper problems.

4. ULF toilets certified for the Los Angeles program

Three ULF toilets passed the test....more on the way!

5. Delivery problems.....what is happening?

Where have all the (new) toilets gone? Nowhere....they just didn't leave "home!"

Full Details

Dual-flush toilets.....do they really save more water?

The answer to that question may be revealed soon through a residential end-use study conducted by Seattle Public Utilities and Aquacraft, Inc, and partially funded by the Environmental Protection Agency.

The study focused on end-use metering of indoor water uses, with data on the pre- and post-retrofit of toilets, showerheads, and faucets and the replacement of clothes washers. Pre- and post-study customer satisfaction surveys were also conducted. Hot and cold water use was separately metered. The study results will be published in an AWWA Journal article in the March 2001 issue. Watch for it. A detailed study report will also be available after March.

For now, however, preliminary study results reveal some interesting new information: Total indoor water use was reduced by more than one-third when new washers, toilets, showerheads, and faucets were installed. Toilet water use was reduced 58%.

In the 37 homes studied, average water use from toilet flushing prior to retrofit was 18.8 gallons per capita per day (pcpd). Homes retrofitted with Toto Drake G-Max 1.6-gallon toilets reduced that figure to 9.1 gallons pcpd. The Caroma Caravelle 305 dual-flush toilets (1.6 gallons full flush, 0.8 gallons half flush for liquid waste) further reduced consumption to only 6.9 gallons pcpd. Therefore, the dual flush toilets added an additional 24% water savings (2.2 gallons pcpd) beyond the traditional 1.6 gpf retrofit.

Both toilets used in the study got high customer satisfaction ratings. As a result of this and other information, Seattle and other water agencies are considering incorporating dual-flush toilet products into their conservation programs.

For further information on this study, contact:

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OR, Peter Mayer of Aquacraft, Inc., at:
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AND, watch for more study details in the March 2001 issue of the AWWA Journal.

The University of Arizona Study: Functioning of Aging Low Consumption Toilets

A just-released study of older (7- and 8-years old) 1.6-gallons-per-flush (gpf) toilets is available for you to download and read in its entirety. Go to:

<http://www.ag.arizona.edu/AZWATER/research/toilet/toilet.html>

(Unfortunately, the Press Release accompanying the study report uses an alarmist headline that does not accurately convey the study findings.)

This work, performed in 1999 by the University of Arizona, examines the condition, functioning, and customer satisfaction with 1.6-gpf toilets purchased, installed and rebated in the 1991-1992 period in Tucson, Arizona. A total of 170 homes were involved. The study was sponsored by the City of Phoenix and the United States Bureau of Reclamation.

Many of you know that the earliest of 1.6-gpf toilets produced for sale in the U.S. in the early 1900s frequently left much to be desired. As manufacturers attempted to quickly bring these new products to the marketplace, they took steps that proved to create problems. For example, reduced trapway diameters, needed to create a strong siphon with only 1.6 gallons of water, led to clogging. In order to reduce development time and manufacturing costs, many manufacturers used their already-available 3.5-gallon tanks and installed early-closing flappers or toilet dams. This, in turn, led to flapper replacements and tampering that increased the flush volume back to three gallons or more.

Here are some of the more interesting and surprising findings of the study:

- 1) 57 percent of the households in the study had no detectable problem with their 7- and 8-year old low-consumption toilets.
- 2) The average flush volume for all of the toilets in the study was 1.98 gallons.

- 3) Comparing the low-consumption toilets with older models, double flushing increased only slightly with the 1.6-gpf toilets: 10.9 percent of the time for low-consumption toilets versus 6.6 percent of the time for older, high-consumption toilets installed in the same household.
- 4) 24 percent of the households with toilets with flappers used in-tank bowl cleaners, although the study did not distinguish among the various types of bowl cleaning products.

Tom Babcock, City of Phoenix, co-sponsor of the study, comments: "I was, frankly, surprised at the research results. I had expected more than 50% failure rate; so the fact that only 43% had some problem was encouraging. The fact that the 43% group includes some toilets that have leaks but otherwise function well is further encouragement. I expect that the reason we found 57% still performing properly may be due to the fact these toilets were installed by persons with a concern for conserving water, not just jumping at the chance to install a new toilet partially at public expense."

Regarding replacement parts, he comments further: "What concerns me the most about the Tucson study is not related to what was found inside the homes, but what was not found in the area hardware and plumbing supply stores: the proper proprietary or OEM (Original Equipment Manufacturer) replacement parts for toilets which require a specific flapper flush valve to work at 1.6 gallons. This issue should be of critical importance to water supply planners. If a toilet reverts to a 3.5-gallon flush in the absence of an OEM part, and those parts either are not available, or the public doesn't know which part to use, then the toilet will probably be a low consumption model for a short time."

For further information, contact Tom Babcock at:
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Progress on flapper durability standards

An update on the report in the last issue of *The Toilet Paper*.....

Last month, manufacturers of flappers and bowl cleaners began conducting tests of their products in accordance with a generally defined set of test protocols agreed upon among both groups. As with the previous durability tests conducted by the Metropolitan Water District (MWD), this series will also begin in 300 and 2000 parts per million of chlorine. Unlike the MWD work, however, tests in this case will not be accelerated, but rather be conducted in more of a true-to-life real time environment. Therefore, the chemical solutions will not be heated to accelerate any chemical reactions between the bowl cleaning solutions and the flappers. Other aspects of the test program differ slightly from previous testing as well, but these variations are not significant to the overall program.

The purpose of the work now underway will be for all of the parties to gain a grasp of what chemical reactions are actually taking place between the two sets of products, i.e. the chemicals and the flapper material compounds. This will begin to provide the ASME/ANSI committee with information needed to develop an "envelope" of pre-determined criteria that could enable flappers and bowl cleaners to be tested and then labeled as falling within these criteria. Thus, in an ideal classification and labeling scenario, flappers would be identified as "meeting" the durability criteria. Bowl-cleaners would similarly be labeled as "meeting" the criteria defining a "harmless" environment in the tank. Flappers and bowl cleaners falling outside the envelope would not have the privilege of such labeling. However, there is likely a very long road ahead before this ideal situation could be realized, if it ever is.

In this area, the interests of the water conservation community are largely on achieving a level of flapper durability that assures (to the maximum extent feasible) that in-tank bowl cleaners will not cause flappers to degrade and leak. However, the interests of the fill valve and flush valve manufacturers are somewhat larger. Their interests are oriented also on the degradation of fill valves when bowl-cleaning chemicals are used and the toilet is not flushed regularly. High concentrations of chlorine in the tank water, coupled with the gaseous chlorine residing in a closed tank above the water line, tend to cause some fill valves to crack and rupture after extended exposure. These failures can lead to catastrophic events, with the toilet quickly overflowing and flooding a bathroom, leading to homeowner claims against toilet and valve manufacturers.

The common goal of water conservation professionals and the product manufacturers is to develop improved products that assure the longevity of the toilet as well as the water savings anticipated by the water planners.

ULFTs certified for the Los Angeles program

Since the adoption (and revision) of the Los Angeles Supplementary Purchase Specification (SPS), certification efforts have been ongoing. To date, the following toilets have been tested and found to meet the requirements of the specification:

Mansfield Alto 130/160
Vitromex/St. Thomas Creations Malibu
Niagara Flapperless 2216

It is reported that the Malibu not only meets current requirements of the SPS, but also meets the requirement anticipated by Los Angeles to be in place on July 1, 2003, that is, functioning within the 2.0-gallon maximum. Unfortunately, Vitromex/St. Thomas Creations has determined that the market for the Malibu within Mexico (where it is manufactured) is so significant that they have scratched plans to bring it into the U.S. market at this time. We will keep you posted on this situation.

Two additional toilets are about to be submitted by other manufacturers for testing and certification. Tom Gackstetter expects that as many as 10 toilets may be certified for his distribution program by the end of the one-year phase-in period for the specification, which ends on June 30, 2001.

For further information on the SPS, consult Issue #1 of *The Toilet Paper*.

OR, contact Tom Gackstetter, Los Angeles Department of Water and Power at:
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Delivery problems...what is happening?

In addition to the Vitromex/St. Thomas Malibu situation (see above), water agencies and their vendors have been experiencing a shortage of Toto Model CST703 and 704 toilets for their free distribution programs. In at least one case earlier this year, several planned truckload deliveries of this product were cancelled on very short notice, leaving an agency and its vendor scrambling for toilets for one of its upcoming distributions. Water agencies, which have favored these products over the years for their toilet distribution programs, asked why this was happening.

According to Toto, the CST703 and 704, which are basic commodity products in the U.S, are in demand in Asia as well, where they are manufactured. Shipments of these toilets to the U.S. have been cut back as product and U.S. inventories are very low. While Toto is considering increasing its production capacity at its various plants to meet local demand here, there is not likely to be an increase of U.S. deliveries (to their former levels) of these two toilets until mid- or late-2001. In the meantime, Toto is focusing its marketing on higher-end, more profitable plumbing fixtures, including those for commercial applications.

Upcoming Issues: Look for.....

- Results of mechanical durability testing
- An update on ongoing toilet testing at the Stevens Institute
- Interviews with some "pioneers"
- ...and more