

# How Low

High Efficiency Comes  
to the Commode

By Wendy Levine

## Can They Go?

**A**h, the old days, when you could just flush any old inappropriate thing down the toilet, often in one try. That diaper or pack of cigarettes (hopefully not from the same source) would go smoothly sailing into the afterlife, with the help of just three to five gallons of water. But those days and quantities are gone. High efficiency isn't just *in*, in some cases it's the law.

Water saving toilets are now the norm, with High Efficiency Toilets the rising stars. HETs bear the seal of approval from WaterSense, the Environmental Protection Agency's water conservation program that certifies products as energy efficient. [See related sidebar—Ed.] This puts them in the "green plumbing" category, raising their profile even further. Kevin McJoynt, director of marketing at Gerber Plumbing Fixtures in Woodbridge, Ill., said government originally generated hot HET sales. "But now it's driven by more market forces and more incentive programs, voluntary programs rather than mandated programs."

### Ins and Especially Outs

What does it take to earn the WaterSense seal? High performance and low flow—1.28 gallons per flush is the magic number, down from the federal requirement of 1.6 gpf. "It's all in the balancing of water," said Joe Gugliuzza, vice president of engineering at Mans-

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—Kevin McJoynt,  
Gerber Plumbing Fixtures

field Plumbing in Perrysville, Ohio, "to make sure that your jet direction is a certain size, the length of the jet, and when it flushes you expose the jet nozzle but it's still underwater and it helps move the velocity of the water through the trap way."

The major water-saving options come in gravity and pressure-assist single flush and dual flush units. The dual flush allows for flushing at two water levels, depending on the, uh, contents. Gerber's version defaults to the lower, 1.2 gallon on the initial downward stroke, which McJoynt said is enough for most consumers. "Many of them don't know it's there and they don't feel the need to do it

because they haven't had a problem with the single." But the handle is reversible, he added, to make the full flush on the downstroke. "We really kind of push it as a peace of mind issue with the dual flush. Most of the people who have put our dual flush units in their homes have never used the full flush."

Gugliuzza said Mansfield is redesigning some of its gravity flush bowls to operate at 1.28 gpf, which will save more than money. "A pressure vessel is fairly expensive to make, and if we can get away from the vessel and just go with a gravity flush but design the toilet, the inside workings, to flush better on less water, that's even better for the consumer and doesn't cost as much."

Both men praised developments in the pressure vessel, which stores water under pressure and emits it under pressure on flushing. McJoynt compared it to putting your finger on a garden hose. “So you’re going to see a lot of water as you normally would but you’re going to get the benefit of the pressure that it had when it came into the house.”

Gugliuzza called it a “water cannon” effect. “There’s also been some water inlet design changes from 2 inches to 3 inches that allow more water to dump into the bowl quicker so you can build more water mass faster—like throwing a bucket of water instead of a glass of water—and you use a lot more head pressure in that respect.”

New fill valve technology also allows for precise calibration of the toilet tank and bowl, said Rich Katzmann, vice president of marketing and sales at MJSI, Inc., in Shorewood, Ill. “Instead of having a predefined ratio of tank to bowl fill volumes intended to work with all toilets, the HydroClean Fill Valve allows

for exact calibration between the tank and bowl for each toilet.” Katzmann credited the technology with boosting toilet efficiency, “because it detects leaks and signals when a leak is found.”

That could solve a problem many consumers don’t know they have. According to recent EPA estimates, 20 percent of all toilets leak, wasting up to 200 gallons of water per day.

So high efficiency units should be an easy sell, right? Not so fast. The pressure assist units aren’t better in every way. They’re a little more expensive and noisy, and low-flow units have a troubled past.

### Learning from their Mistakes

When national flush standards were lowered more than a decade ago, the early versions literally left a lot to be desired. “Conventional toilets, in the late 1980s and early ‘90s used anywhere from 5- to 8 ½ gallons per flush. When they switched to 1.6 flush, they didn’t change any of the design factors,” explained



Vortens' Manchester Dual Flush Toilet



Bondi 305 Toilet by Caroma

Chris Peterson, regional sales manager at Saniflo in Edison, N.J. The reduced water impeded the toilet’s ability to siphon out the waste. Since then, said Peterson, the trap ways have been opened up to allow the 1.6 to do the same job as a 5 gallon unit could do back in the day.

McJoynt blamed the bowl’s inadequate water surface. “So it’s very difficult to sell a toilet like that now because people associate them with poor performance.” Now, said McJoynt, they’re doing more with less water, but with much more highly engineered products. “It’s really kind of a delicate tradeoff between a large trap way for bulk weight and a strong enough siphon to actually clear the bowl entirely.”

## Hot HETs



Gerber Ultraflush Toilet

A more holistic approach may help. Derek Kirkpatrick, North American manager for Caroma Industries in British Columbia, viewed the efficiency improvements as changes to the system itself: "The changes have been in the way the tank discharges the water, the amount of water used, the shapes of the bowl, and how the tank, bowl and water interact with each other. In other words, they have looked at the toilet as not just separate components, but rather as an integrated plumbing system, all the way through to the line carry."

### Following the Green

When it comes to water-saving toilets, Caroma Industries believes it's sitting pretty. Kirkpatrick said the company was green before green was in. "Caroma's line of toilets exceeded the government requirements for well over 20 years, and today we continue to develop new technologies that continually improve efficiency on all counts."

MJSI's Katzmann said green technology has moved from the fringe consumer to the mainstream. "Dealers are telling us that during the sale, if there is a 'greener' alternative, more than 50 percent of the time, it will be purchased." And as the innovations continue the market adapts. "We are hearing from retailers across the country that because of the water and money savings, we are expanding the toilet fill valve market by moving it from a repair item to a home improvement item," said Katzmann. MJSI has partnered with Green Spec to certify its product as a water saver.

### How Low Will They Go?

With toilets operating on one gallon of water,



# CERTIFIED

## Bestowers of the WaterSense Label

The Environmental Protection Agency's water-conserving program WaterSense is in full swing after only a year. Beginning with high efficiency toilets, the initiative has recently branched out to include lavatory faucets and soon, showerheads. Manufacturers nationwide are striving to develop products that meet the criteria, starting with the 1.28 gallon per flush requirement, 20 percent below the 1.6 gpf national standard. Perhaps in response to previous disappointments in low-flow capabilities, products must also meet performance criteria to earn the coveted label, which features a blue and green droplet.

The existence of an EPA blessed product doesn't just benefit green-conscious consumers. It's also a boon to the third-party organizations that certify the equipment. IAPMO Research and Testing in Ontario, Calif. certifies and lists WaterSense-approved HETs and has now been cleared to add bathroom faucets. Senior director Shahin Moinian said, "We are excited to be able to offer this service to our clients."

Also expanding its certification authority is NSF International in Ann Arbor, Mich. The independent organization has received approval to certify both products to the WaterSense specifications as well. Vice president Bob Ferguson called the not-for-profit a natural choice to participate and added, "We are pleased to be cooperating with the EPA in this important program to conserve water."

Underwriters Laboratories in Northbrook, Ill., will add lavatory faucets and faucet accessories to its offerings. "UL is continuing its dedication to public safety by helping manufacturers meet the demand for more environmentally responsible products," said Ann Marie Gebhart, UL's water program director.

how much lower could standards go? Probably not much lower, without deteriorating performance and causing damage.

But Peterson of Saniflo won't rule anything out. "In the future, once newer technologies are developed or some design comes about that allows you to use less, that might become a factor but for now, I think 1.1 is about the lowest that you're going to see. Any lower, it's like a dry flush. It wouldn't make any sense."

"If you take too much water out of the system overall, you'll have problems in the plumbing lines, not just in the toilet itself but throughout the system," added McJoynt. "Because 3-inch pipes need a certain amount of water to keep themselves clear." He suggested a trip back to the drawing board might be in order. "I think what we'll find is the lower we go, the more risk we have of affecting negatively overall drainage systems, so then they would need to be redesigned and reworked."

Mansfield's Gugliuzza also had an eye on the horizon. "I believe that the really new concepts and technology will take the toilet from just a ceramic item to having multiple materials that will mechanically move or function to help assist the water, just like a pressure vessel does, maybe in a mechanical fashion, to move the media from, like a foot pedal or some

other means to really minimize the amount of water, you can get down to say a half a gallon." But he concluded that anything below that "would be a stretch."

So forget about flushing those bulky unwanted items. Today's high efficiency toilets simply won't tolerate them. The HET's loss is likely a landfill's gain but it's also a gain for water conservation. ■

On Oct. 11, legislation was signed into California law by Governor Schwarzenegger, making High Efficiency Toilets and High Efficiency Urinals mandatory in seven years. Under the amended rules, HETs will be phased in beginning in 2010 and by 2014, all tanks will be held to the 1.28 gpf standard. Levels for urinals, which have a current standard of 1.0 gpf, drop to 0.5 in 2014.

Other changes involve state agencies, which by July 1, 2009, will propose standards governing the use of waterless urinals. Manufacturers will then be required to report to California building officials the percentage of HETs and urinals offered for sale in the state. The PHCC noted that similar legislation was considered in 2006 but was vetoed by Schwarzenegger, who argued at the time that changes to plumbing standards should be considered by building code officials rather than legislators.