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Toilet designs making leaps in water savings

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The Press-Enterprise

There's been a lot of talk lately about toilets and water savings, but the truth is, not all johns are created equal.

The key to good function is good design, experts say.

High-efficiency toilets are the latest in conservation circles. They use 1.28 gallons of water per flush or less, which makes them eligible for rebates. This category also includes dual-flush potties that use the full amount of water for solids, and half that for liquids.

"HETs," as they are known in the industry, are not to be confused with low-flow toilets, the early generation of commodes mandated by federal law in 1994 to use 1.6 gallons per flush.

That's what Charles Cox, of San Bernardino, has. He complained that his low-flow toilet requires two or three flushes to finish the job and in the end is less efficient than the old 3.5-gallon model it replaced.

"Somebody is making a lot of money off selling new toilets," said Cox, a licensed general contractor who installs them. "The very best design in toilets is an outhouse. It doesn't require any water."

But plumbers and conservation experts say design changes have made "lazy flushers" a thing of the past. Still, misconceptions persist.

Manufacturers rushing to meet new standards in 1994 often cobbled together old toilets with new tanks that used less water without actually redesigning the products, said Chris Brown, executive director of the California Urban Water Conservation Council in Sacramento.

Since then, manufacturers have changed molds to enlarge passages inside the bowl and upgraded siphon valves and flappers.

In the early days, there were no performance standards. Manufacturers tested the toilets using golf balls, potatoes and ping pong balls, which did not mimic the form or weight of human waste, Brown said.

Los Angeles Department of Water and Power was the first to study performance after installing low-flow toilets and getting lots of complaints; from that effort came the council's Maximum Performance Testing, which ranks more than 1,000 models of high-efficiency toilets and is the source for water district rebates.

Toilets make the list only if they can flush at least 350 grams of material, which equates to a little larger than a medium-sized potato, said John Koeller, the council's technical adviser on testing. Many high-efficiency toilets flush as much as 1,000 grams of material and earn the U.S. Environmental Protection Agency's WaterSense label, a program similar to EnergyStar that rates the most efficient appliances.

Koeller and tester Bill Gauley pride themselves on the reality of their test medium, developed in 2002 and now an industry standard. They tried silly putty, oatmeal, cereal and other products to replicate the real thing

before settling on soy paste encased in condoms.

The toilets work using two types of technology: gravity, which pushes or pulls waste out of the bowl using a siphon, and pressure-assist, which uses compressed air in the tank to force water through the bowl and into the trap, said John Raya of Plumbing Concepts Inc. in Yorba Linda, a certified green plumber trained in conservation.

Compared to a 3.5-gallon-per-flush toilet, a high-efficiency model could save a family of four about 15,600 gallons a year; a dual-flush version would conserve almost 18,000 gallons. The toilets cost $200 to $300, and many water districts have rebates that cover half the cost or more.

"Some of this is buyer's education and being aware and finding the right product," Raya said. "There's still a lot of old-style thinking. People are just used to certain things. I'm old enough to remember hearing the *whoosh* when I flushed the toilet."

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Down the Drain

Approximate volume of water needed per flush

Pre-1980: 5-7 gallons

1980s: 3.5 gallons

1994: 1.6 gallons

2009: 1 gallon

Annual household water consumption per person for different toilets

3.5 gallons-per-flush - 7,023 gallons

1.6 gallons-per-flush - 3,701 gallons

1.28 gallons-per-flush - 2,308 gallons

1.0 gallon-per-flush - 1,898 gallons

Source: www.ToiletABCs.com