

Successful water-savers

A number of good choices emerged from our tests.



You should be able to take certain things for granted, such as a toilet's ability to do its job the first time you move the lever. Since Congress mandated low-flush toilets as a water-saving measure in 1994, though, people have learned that two flushes or even three may be needed with a poorly designed toilet--negating any water-saving. (Toilets on the market now can use only 1.6 gallons of water per flush. Older toilets used 3.5 to 7 gallons.)

Some members of Congress recently proposed rescinding the requirement for low-flush toilets, but that's not likely to happen anytime soon. There's also less reason than ever to do that, judging from our tests.

The photo above shows nearly all the 28 toilets we tested. They represent all the major manufacturers. Most are part of extensive model lines that give you a choice of round-front or elongated bowl, different tank designs, and so on. Most are two-piece designs, with a tank that bolts onto the bowl. The more expensive toilets tend to be one-piece designs. Nearly all come in several colors. They range in price from \$100 to more than \$600. The \$600 *Kohler San Raphael* was judged very good, but it wasn't as good as the top-rated *Briggs Vacuity 4200* at \$220.

HOW THE MAIN TYPES FARED

Vacuum. The *Briggs Vacuity 4200* is one of two we tested that use vacuum chambers inside the tank to help pull water and waste down the drain. Vacuum-assist toilets aren't the most common design; it would be good if more appeared on the market. The pair we tested performed very well, and both are moderately priced. We have found that vacuum-assist toilets are as quiet as some gravity-flush toilets, the more common variety. Vacuum-assist toilets use the same kind of early-closing flush and fill valves that gravity-flush toilets do, so they're simple to maintain.

Gravity-flush. These toilets work the old-fashioned way, using water pouring from the tank to start a siphoning action that clears the bowl and pushes waste down the drain. The gravity-flush toilet is the type used most often for home installations. The performance of some gravity-flush toilets no doubt contributed to the conventional wisdom that low-flush toilets generally clogged or needed two flushes. As the Ratings indicate, many gravity-flush toilets weren't very good at removing solid waste. However, we did find seven that performed well.

Many gravity-flush toilets cost less than \$200; more-expensive versions deliver more style, not necessarily better performance. This type of toilet is fairly easy to install and inexpensive to maintain. Most use a standard fill valve and a specially designed flush valve.

Pressure-assisted. These use a pressure tank to force water into the bowl. They work very well--some were better than the vacuum-assist toilets--as long as household water pressure is at least 25 pounds per square inch. Pressure-assisted toilets tend to be pricey and noisy. Their raucous whoosh can be disconcerting.

TALKING TESTING

Just how do we test toilets? Tastefully and methodically. We use small squares of sponge, small plastic balls, baby wipes, and latex cylinders to gauge how well the toilets remove solid waste. That's our most important performance criterion, and we ran numerous tests to gauge that performance.

The most demanding test, repeated five times for each toilet, used 160 plastic balls, seven sponges of various sizes and shapes, and two water-filled latex cylinders. The better toilets could clear that large load on one flush.

Dyes told us how well the toilets dilute liquids. Latex paint and lines drawn inside the bowls with water-soluble ink measured how well one flush cleaned them.

Clearing waste. The pressure-assisted models did the best job, clearing waste reliably in a single flush. If the toilets in your house clog frequently, consider replacing them with a pressure-assisted model.

Both of the vacuum-assist toilets and a couple of gravity-flush models were very good at removing waste, which has to clear the bowl and the twists and turns of the toilet's trap. That's where many gravity-flush toilets have a tendency to clog.

Cleaning the bowl. Most toilets did a good job of washing away the paint and pen marks we put in the bowl. If some bowl surfaces aren't covered by water, however, there is the potential for stains and odor. To assess that possibility, we measure the area and depth of each toilet's water coverage.

Clearing liquid waste. Residual liquid waste in the bowl can also cause odors. Most of the toilets performed very well, exceeding industry standards for bowl-clearing. A couple, however, left behind substantial traces of the blue dye we used to measure dilution.

RECOMMENDATIONS

Bathroom remodeling is the most common reason for buying a new toilet. Toilets generally last forever (warranties are typically lifetime on the porcelain parts, one to five years on the working parts), so you may want to keep your old toilet if it fits the new decorating scheme.

You can make any older toilet more water-efficient by placing a water-filled bottle in the tank or installing a special flapper valve. Those measures are likely to worsen flushing performance, however.

If you're looking to replace a toilet, search out the *Briggs Vacuity 4200*. You'll likely find it at small, privately owned plumbing-supply stores rather than at the big home-centers. The other vacuum-assist toilet we tested, the *Crane Vacuum Induced Power Flush VIP 3999*, performed very well, too, and is favorably priced around \$250.

Of the 19 gravity toilets we tested, three performed noticeably better than the others. The *Kohler Wellworth 3422*, \$150, and *American Standard Cadet 2798.012*, \$170, are both good performers, but the *Kohler* is clearly the better value. The other very good gravity-flush toilet, the *Toto Carlyle MS874114SG*, \$460, offers a more stylized one-piece design with a plastic trapway.

With most pressure-assisted models, expect a big step up in price. Some, such as the *Crane Economiser*, cost less than \$300; many sell for more. The ones we tested performed very reliably, but they are all noisy. That may put a pressure-assisted toilet out of contention, depending on the proximity of bathroom and bedrooms.

How the main toilet types work

PRESSURE ASSISTED



VACUUM ASSIST

A vacuum chamber inside the tank works like a siphon to pull air out of the trap below the bowl so that it can quickly fill with water to clear waste. This is the tank on the top-rated *Briggs Vacuity* (above), \$220.

The china covers a tank of pressurized water. It expands with a loud whoosh when you flush, adding force to help push waste away. Most work mechanically. Noise is the biggest drawback of a pressure-assist toilet. Shown below, the *Crane Economiser*.



GRAVITY

The tried-and-true mechanism, which depends on water dropping from the tank into the bowl and trap to move waste down the drain. This is the flushing mechanism inside the *Kohler Wellworth* (above), one of the best gravity-flush models we tested.



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