

# Dual Flush: A Vote for Water Conservation

How is a toilet stall like a voting booth? If dual-flush water closets are installed, informed users can vote for or against water conservation as they pull the lever because these fixtures allow users to choose how much water they want to use when they flush.

In response to the growing demand for water-efficient plumbing fixtures, manufacturers are providing new dual-flush water closets to the market. These fixtures have a different flushing valve than conventional water closets, so users and plumbing engineers will need some training on their use. This article first will discuss how to use this new technology and then some of the new products on the market.

## HOW DOES THIS NEW VOTING MACHINE WORK?

The concept is very simple: Dual-flush water closets have two methods of flushing. One option will flush the same 1.6 gallons of water as the conventional water closet. However, the intent of a dual-flush water closet is to use the full-flush option only when flushing solid waste out of the bowl.

The dual-flush water closet's unique feature is the option that uses a lower amount of water than the full 1.6-gallon flush. For most units the reduced amount of water is 0.8-1.1 gallons per flush. The intent of this flush is to clear liquid waste out of the bowl.

This dual-flush approach requires some education. Several universities are conducting informal studies on user response to these fixtures. According to their findings, the majority of users likes having the low-flush option. However, other formal studies are needed to see if the low-flush option actually will be used. In public toilets users may not notice the dual-flush feature or may not know how to use it without instructional signage. In contrast, employees at an office building who use the same toilet every day will become accustomed to the fixtures, and it is predicted that people in such a situation will use the low-flush feature when they can.

## WHAT TYPES OF DUAL-FLUSH WATER CLOSETS ARE AVAILABLE?

Gravity dual-flush tank water closets have been available for the residential and light commercial markets for several years. Kohler and Toto USA offer fixtures in which the bowl and flush tank are designed to handle both full- and low-flush options. There is little or no premium in the cost of these dual-flush water closets when compared to conventional fixtures. (Please note that this article will not list every manufacturer that makes these fixtures. The intent is to introduce the concept of dual-flush water closets. Check with other manufacturers to see what is available.)

Other fixture manufacturers such as Caroma USA have offered gravity-type dual-flush water closets in the United States for several years. Because it was early into the marketplace, Caroma has established a foothold in the United States for its product. The company's water closet has been used successfully in Australia for many years where potable water often is in short supply due to the arid climate.

Most of these manufacturers now have dual-flush fixtures for the light commercial market available with elongated bowls and American With Disabilities Act (ADA)-compliant heights. Manufacturers have spent a lot of effort in designing and manufacturing dual-flush valve mechanisms, and these units appear to have high-quality parts that should last for many years.

(This is a good time to comment on the state of technology for gravity-type water closets. In most local hardware stores the old toilet-flap technology is still available. In the majority of residential bathrooms across the country, users most likely have to jiggle the water closet's flush handle for the water to stop running into the bowl. How many times have you reached into a tank to change one of those old flappers and thought there has to be a better way? If they haven't already, most manufacturers are getting ready to introduce new dual-flush products to the marketplace. However, at this time it is unknown what percentage of the water closet market will use dual-flush technology in the near future.)

Pressure-assisted water closets are now available with the dual-flush technology. Some of the major manufacturers are making pressure-assisted dual-flush units that meet ADA requirements and have elongated bowls. Pressure-assisted units have developed over time in reliability and functionality.

The newest item on the market is the dual-flush meter valve. Sloan Valve Co. and Zurn Plumbing Products among other manufacturers have introduced this product. The basic concept is that these flush valves will look and operate very similar to the current valves. (Upgrade kits are available to change standard flush valves to dual-flush valves.) These valves operate the 1.6-gallon flush when pushed to the down position. Moving the valve up operates the low-water-usage flush. As users usually push the valve lever down to operate the flush, labeling is available for the lever and a sign is available for mounting on the wall next to the valve instructing the user about the up and down operation of the valve (see Figure 1).

The pricing for these valves is comparable to standard flush-meter-type valves. As a result, owners will be tempted to purchase these valves and try them out. Owners also might ask plumbing professionals how these valves work and if they are worth considering for their next project.

**Figure 1** Labeling on dual-flush water closets allows users to vote for or against water conservation.



Source: Zurn Plumbing

# I went into the engineering business, not the mixing valve business.

*So when we ran into trouble maintaining water temperature at the nursing home, I called THE mixing valve specialists at Leonard Valve Company.*



I was a young consulting engineer working on a nursing home job and, we ran into a problem: The inspectors determined that the water temperature wasn't being maintained, even though we had sized the valves according to code to handle the high- and low-flow demands typical in nursing homes.

***As a result, the nursing home was being fined \$5K per day, and my boss was getting an earful. I called the Leonard factory engineer to discuss the problem.***

We went over it on the phone and identified the cause as an oversized valve. He sent me internal parts, and I took the guts of a small valve and put it in the bigger valve. That helped the situation, but didn't solve the overall problem. We were still getting spikes that were creeping up to 150 degrees at night. I had to try to fix it, or we would get sued.

***I was at my wits' end because I had never experienced this type of situation. At that point I was talking to the Leonard Valve engineer two to three times a day. Finally, he said, "Do you want me to come out there?"***

He made the trip, and we went to the job. After troubleshooting through the night, he challenged the report by the plumber that stated the recirculation system was balanced. Different slugs of return were coming back in slugs in different temperatures.

***The Leonard engineer was able to balance it all out and achieve consistent temperature on the return. After that, I became a loyal Leonard specifier.***

Since then I have visited the Leonard Valve factory. Every valve is tested before it goes out so they can catch any problem before it ships. Their quality control is top notch—and so is their service.

***Call the mixing valve specialists.  
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## PLUMBING TECHNOLOGY of the FUTURE

Installation of these valves is similar to that of standard valves, so little if any training time will be required for installers. Maintenance and operations staff will like that the installation of the dual-flush diaphragm and/or handle is also similar to standard diaphragms.

The one item that has not changed yet is the dual-flush meter valve water closet bowl. The china manufacturers have engineered and developed special bowls for gravity-type water closets, but they do not offer a special bowl for dual-flush meter valves. However, flush valve manufacturers say that a special bowl is not required.

### GREEN PRODUCTS CHANGE THE MARKETPLACE

The wide availability of dual-flush water closet technology has produced a tipping point for the water-efficiency efforts of the green, or sustainable, building movement.

A few years ago a handful of visionary individuals stated that promoting sustainable building methods would result in a marketplace in which owners could follow these methods with little or no extra cost. For that to happen owners would have to create a need for green products, and manufacturers would respond by providing them.

At that time critics said it was a chicken-and-egg problem. Manufacturers will not build green products until there is a need in the marketplace, and owners will not buy expensive green products to create a demand.

Today we are experiencing a turning point in the marketplace. Manufacturers are making green products at fair prices, and owners are buying these products in large quantities. In fact, green buildings save owners, operators, and installers money in the long run. At some point the green methods that once were perceived to be radical will become commonplace.

Because of their simplicity, expected acceptance by users, and the low cost of installation, dual-flush water closets should be regular fixtures in new facilities.

With the high cost of energy this past year, individuals and groups are taking a second look at energy conservation. Because of recent droughts and increasing urban sprawl, water utility companies are raising water rates at a rapid pace, causing these same groups to take a second look at the high cost of potable water and sewer treatment as well.

Homeowners and building owners are seeing savings and profits slip away with higher-than-expected energy, water, and sewer bills and are looking for new ways to reduce these costs. When the market provides products such as dual-flush water closets that can be purchased and installed with little or no additional front-end costs, owners purchase them.

### DUAL-FLUSH WATER CLOSETS AND LEED CREDITS

When designing buildings to meet the U.S. Green Building Council (USGBC.org) Leadership in Energy and Environmental Design (LEED) sustainable building rating system, installing dual-flush units will help obtain water-efficiency credits. One point can be obtained by reducing the amount of potable water used in a facility by 20 percent, and an additional point can be

obtained by reducing the amount of potable water used by 30 percent.

In most cases dual-flush water closets will not sufficiently reduce the amount of water used to obtain an entire point. However, incorporating dual-flush fixtures with other water-efficient fixtures can help obtain one or more of these points.

LEED New Construction (LEED-NC), the rating system used for most buildings, is based on a calculation that assumes building occupants use a 1.6-gallons-per-flush fixture four times a day. If urinals are available, the calculation assumes men use the urinal three times a day and the water closet once a day. In this case, using low-flow or waterless urinals will reduce a large amount of potable water used; however, using dual-flush water closets in the men's rest rooms may not reduce the amount of water used because males most often will flush solids at the full 1.6-gallons-per-flush rate.

When dual-flush water closets are installed in the women's rest rooms, the LEED calculation is based on women using the low-flush option three times a day and the full flush once a day. Thus, dual-flush water closets can help the women's rest rooms count toward obtaining water-efficiency credits.

There may be some confusion when using the templates provided by the USGBC because dual-flush water closets are not listed as an option. To obtain credits, the dual-flush fixture should be listed as a custom fixture on the flush fixture table. It is important to note that each LEED building is unique, and coordination between the LEED facilitator and the USGBC representative may be required to obtain this credit.

In the future will users have the option to vote on water conservation in the privacy of the toilet stall? By incorporating dual-flush toilet fixtures in your designs, you will liberate the masses, so they can practice democracy and vote for water conservation in a toilet stall near you. When using dual-flush water closets, vote early and vote often. **PSD**



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