

Ultra Low Flush Toilets

A MASSACHUSETTS WATER RESOURCES AUTHORITY PUBLICATION

In recent years, the perception that water is plentiful has been replaced by the realization that a good water supply is a valuable asset, worth conserving and protecting. Consumers are also discovering that more efficient water use can alleviate the strain on their water supplies *and* their wallets. 1.6 gallon per flush Ultra Low Flush Toilets, also called *Low Consumption* and *Low Flow* Toilets, have played a big part in making water efficiency at home possible.

In 1989, revisions to the plumbing code made Massachusetts the first state in the United States to require the installation of Ultra Low Flush Toilets and other water efficient plumbing fixtures for all new construction, remodeling and replacement projects. Several other states soon followed Massachusetts' lead.

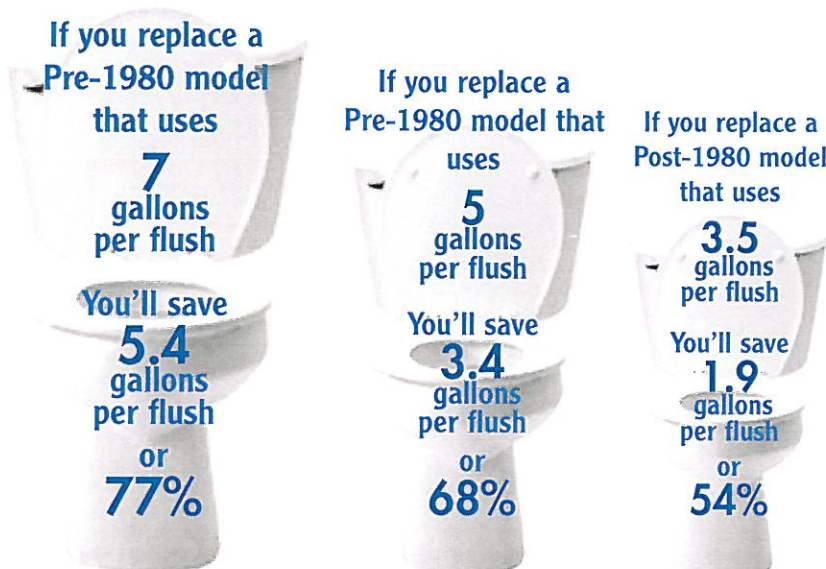
In January 1994, federal standards for plumbing products went into effect. They prohibit the manufacture of wasteful plumbing fixtures and ensure that only 1.6 gallon-per-flush toilets are sold.

- **WHY REPLACE A TOILET:** Toilets account for over a third of the water used in most homes. Installing an ultra low flow toilet will save thousands of gallons each year and can automatically and permanently reduce your bathroom water use by more than half.
- **WHEN TO REPLACE A TOILET:** A good time to replace your toilet is during renovations or repairs. You should consider replacement anytime a toilet is leaking – a leaking toilet can waste up to 18,000 gallons of water in a year!
- **HOW TO CHECK FOR LEAKS:** Here's an easy way to test for leaks: Put 2 dye tablets, or a few drops of food coloring, or a couple of tablespoons of instant coffee or powdered fruit drink mix (grape or cherry) in the tank. Wait 10-15 minutes. If dyed water seeps into the bowl, you have a leak. This could mean your flush valve or refill valve needs replacing.

HOW TO USE THIS FACT SHEET

This fact sheet was prepared to help you make informed purchase and replacement decisions. The information presented here is not intended to serve as a substitute for the judgement of a plumber, engineer, retailer or contractor. However, we hope that it will help you to have informed discussions with these professionals.

HOW MUCH WATER DOES INSTALLING A 1.6 GALLON TOILET SAVE?



Whether you replace one toilet in a single bathroom or several hundred toilets in a large commercial or residential complex, you can expect to see significant savings. For example, replacing a typical 3.5 gallon toilet with a 1.6 gallon model will save a family of four 11,096 gallons per year. That's a 54% reduction in toilet water use. The more water the toilet you're replacing uses, the more you'll save.

HOW TO CHOOSE A TOILET

Not all Ultra Low Flush Toilets are the same. Customer satisfaction varies among different types, models and manufacturers. There is also a wide range in price. Before you buy, consider which type of toilet is best for your home or building. These checklists can guide you in your search.

WHICH TYPE OF TOILET IS RIGHT FOR YOU?

Consider which of the residential ultra low flush toilet types is best for your home:

- **GRAVITY TOILETS** are the most common. Water is stored in a tank and when flushed, the water is released through a flapper valve and driven by gravity to clear out the bowl. These toilets require approximately 10-15 pounds per square inch (psi) of pressure at the connection to function properly. Gravity toilets are relatively inexpensive, ranging from \$75 to \$150.
- **PRESSURE ASSISTED TOILETS** are hybrids of gravity and flush valve toilets. A pressurized tank placed inside the porcelain tank compresses a pocket of air and releases pressurized water into the bowl and out the trapway at high velocity. The flushing action of these toilets is noisier than the gravity types', and they require a minimum water pressure of 25 psi to operate properly. Prices for these toilets are usually over \$150.
- **FLUSHOMETER TOILETS** are found in most commercial buildings. They have no tank but rely instead on a pressure-operated valve directly connected to the building's water supply. They require a large supply pipe and a minimum water pressure of 23-40 psi to operate well. These toilets are priced at about \$250.

PERFORMANCE

Customer satisfaction surveys show that newer 1.6 gallon toilets perform as well, if not better than, the 3.5 gallon water-wasters they replace. Customer concerns about clogging and double-flushing of earlier Ultra Low Flush models have been addressed by manufacturers, and today's toilets have been redesigned to improve performance. Several design and plumbing features factor into how well an Ultra Low Flush Toilet works:

- **WATER SEAL:** The surface area of the water standing in the bowl, which correlates with bowl staining. A small water seal can produce more staining and require more frequent cleanings.
- **WASTE REMOVAL:** How well the toilet evacuates bulk and waste from the bowl. Insufficient waste removal is the main cause of double-flushing.
- **DILUTION:** The completeness of water change in the bowl.
- **DRAIN LINE CARRY:** How far the toilet transports solid waste down a sewer line.
- **NOISE:** What you hear when you flush.

FACTORS THAT AFFECT COST

- **COLOR:** 'Natural' and other non-white finishes may cost more.
- **BOWL SHAPE:** Elongated or round bowls can differ in price.
- **DESIGN:** One-piece or two-piece models are available. One-piece models are usually more expensive.
- **ROUGH IN:** The distance from the wall to the flange bolts that hold the toilet down. Standard is 12 inches, but 10-inch and 14-inch models are also available. Make sure you buy the right size.

YOU SHOULD ALSO CONSIDER...

- **GLAZED TRAPWAYS:** Most models have this feature, which improves waste removal and reduces staining.
- **NOISE LEVELS:** Pressure-assisted toilets tend to be louder than gravity models. Ask about toilet noise levels before you buy.
- **THE FOOTPRINT:** Check the footprint of your new toilet to determine if any floor patching will need to be done around the base.
- **WARRANTIES:** Look for manufacturer warranties that guarantee the toilet components for many years.
- **EXPERTISE:** We recommend that you consult a licensed plumber before installing any toilet.

HOW MUCH MONEY CAN YOU SAVE?

Water savings can be converted into dollar savings. The charts on this fact sheet present examples of the amount of money an average family of four can save, and the calculation for determining the 'payback' from your investment.

YEARLY SAVINGS FOR A FAMILY OF FOUR FROM SWITCHING TO AN ULTRA LOW FLUSH TOILET

Gallons per flush	X	Daily Flushes	X	People in household	X	Days in a year	X	Average cost of 1,000 gallons water and sewer	÷	1,000 gallons	=	Cost per year
3.5 gallon (old model)*	X	4	X	4	X	365	X	\$7.00	÷	1,000	=	\$143.00
1.6 gallon (Ultra Low Flush Model)	X	4	X	4	X	365	X	\$7.00	÷	1,000	=	\$65.00
*without a toilet dam								Yearly Savings with the Ultra Low Flush Toilet:		=	\$ 78.00	

CALCULATE YOUR PAYBACK TIME

Your payback time is the time it will take for you to recover the cost of buying and installing an ultra low flush toilet.

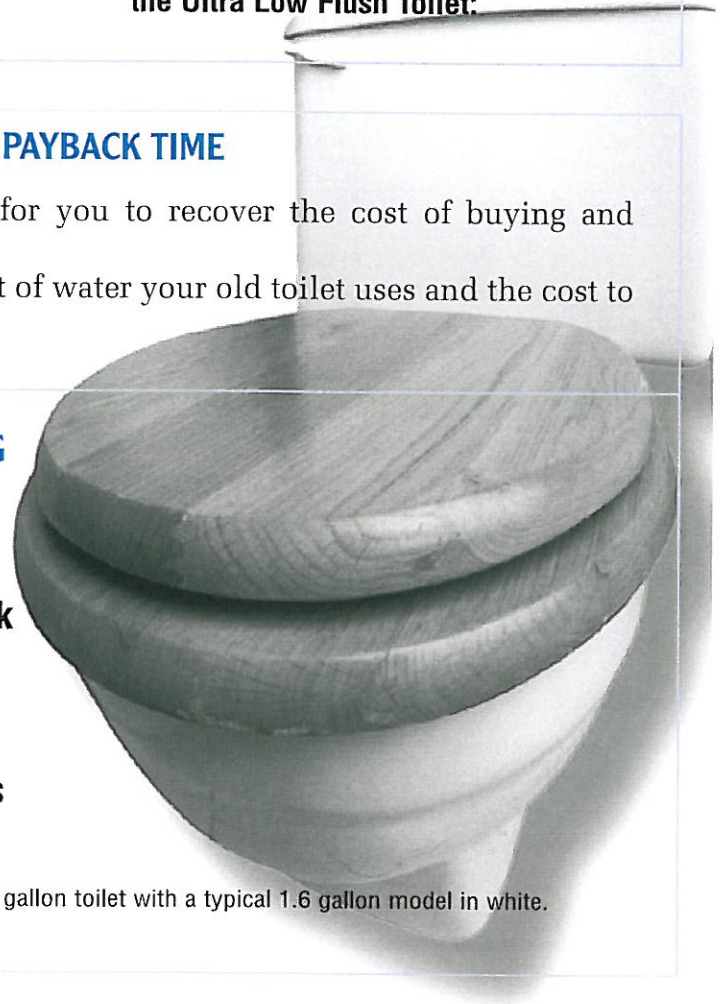
Your payback time will depend on the amount of water your old toilet uses and the cost to purchase and install a 1.6 gallon model.

SAMPLE PAYBACK TIME FOR SWITCHING TO AN ULTRA LOW FLUSH TOILET

$$\begin{array}{l} \text{Approximate} \\ \text{Installation} \\ \text{Cost} \end{array} \div \begin{array}{l} \text{Yearly} \\ \text{Savings} \end{array} = \begin{array}{l} \text{Payback} \\ \text{Time} \end{array}$$

$$\$260.00 \div \$78.00 = 3.3 \text{ years}$$

Installation cost includes labor and materials for replacing a 3.5 gallon toilet with a typical 1.6 gallon model in white.



FIND YOUR YEARLY DOLLAR SAVINGS FROM INSTALLING AN ULTRA LOW FLUSH TOILET*

Use the number in the left hand column that's closest to your home's average number of flushes per day and the dollar amount that's closest to your community's water rate to find your yearly dollar savings. Check with your local water/sewer utility, or visit MWRA's website: WWW.MWRA.STATE.MA.US/ORG/HTML/RATES_HOUSE_CHARGES.HTM for your current rate.

CITY/TOWN COMBINED WATER AND SEWER RATES IN COST PER 100 CUBIC FEET**

	\$4	\$5	\$6	\$7	\$8	\$9	\$10	\$11
AVERAGE YEARLY SAVINGS	\$8	\$11	\$51	\$14	\$17	\$19	\$21	\$23
	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35
	\$17	\$21	\$25	\$30	\$33	\$38	\$41	\$46
	\$21	\$26	\$32	\$37	\$41	\$47	\$52	\$56
	\$25	\$32	\$38	\$44	\$50	\$56	\$62	\$69
	\$29	\$37	\$44	\$51	\$59	\$65	\$73	\$80
	\$33	\$41	\$50	\$59	\$67	\$75	\$83	\$92
	\$38	\$47	\$56	\$65	\$75	\$84	\$94	\$103
	\$41	\$52	\$63	\$73	\$83	\$94	\$104	\$115

* Assumes that one 3.5 gallon per flush toilet, in a model installed after 1980, is being replaced. Earlier models may use up to 7.0 gallons per flush, in which case your savings would be even greater.

** 100 cubic feet = 750 gallons

A WORD ABOUT FLAPPERS

Water savings from an Ultra Low Flush Toilet can be significantly reduced if the flush valve closure device called a flapper doesn't work properly. Flappers have an average life span of five years before they begin to fail, creating water leaks. Replacing a worn out flapper with one that is compatible is essential for maintaining your Ultra Low Flush Toilet's water savings. Replacement flappers for some Ultra Low Flush Toilets can be hard to find. Try contacting the toilet's manufacturer, or call MWRA at 617-242-7283 (SAVE) for suggestions.

REFERENCES AND PERFORMANCE TESTS

The American National Standards Institute (ANSI) designs minimum performance tests and standards for Ultra Low Flush Toilets. Make sure you choose a model that meets these standards. Several excellent studies have been conducted. Here is a list of resources for more information.

- **THE WATER EFFICIENCY CLEARINGHOUSE (WATER WISER):** 6666 West Quincy Avenue, Denver, CO 80235-9913. Tel:1-(800) 559-9855, website: WWW.WATERWISER.ORG. See "Water Conservation Tips for the Home" under the books heading.
- **CONSUMER REPORTS:** "Low Flush Toilets, In search of a Better Toilet". Vol. 63, No. 5, pages 44-46, May 1998.
- **SEATTLE PUBLIC UTILITIES:** Owner's guide on Purchasing Low Consumption Toilets: WWW.CITYOFSEATTLE.NET/UTIL/EFFICIENTTOILETS
- **TERRY LOVE'S CONSUMER TOILET REPORTS:** A Plumber's Report on Low Flow Water Efficient Toilets: WWW.TERRYLOVE.COM/CRTOILET.COM
- **RELATED WEBSITE:** WWW.TOILETOLOGY.COM

REMEMBER...

- **NEVER** use your toilet as a waste basket. Synthetic fibers such as dental floss or plastic wrappers can clog drains and cause backups.
- **ALWAYS** hold down the handle until the tank fully empties (some models don't have a quick flush).
- **NEVER** use toilet bowl cleaners inside the tank. They're corrosive, causing parts to disintegrate, resulting in leaks.

MWRA offers a variety of informational materials on the region's water and wastewater systems and the natural environment. To find out what's available:

CALL US:

MWRA Public Info Line: 617-788-1170

MWRA Water Conservation Line: 617-242-7283 (SAVE)

VISIT OUR WEB SITE: WWW.MWRA.COM

WRITE TO US:

MWRA
Public Information Unit
Charlestown Navy Yard
100 First Avenue
Boston, MA 02129

