Dual Flush Toilets

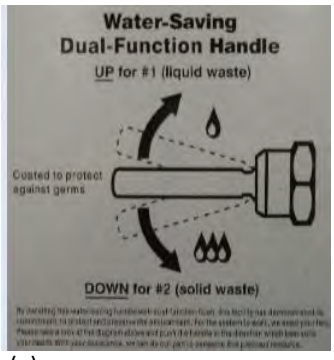
[STRATEGY]

BRIEF DESCRIPTION

Dual flush toilets provide two options for users to dispose of liquid or solid wastes. Dual flush toilets certified under the Environmental Protection Agency's (EPA) WaterSense program must use no more than an average equivalent flush volume of 1.28 gallons, which is typically achieved through a liquid waste flush of 0.8 gallons of water and a solid waste flush of 1.6 gallons of water. WaterSense certified dual flush toilets must also meet waste removal performance requirements to ensure performance is not compromised with the lower flush volumes.

Applications

Locker Rooms, Restrooms



(a)

(b)

(a) Water-Saving Dual-Function Handle (Source: http://www.sloanvalve.com/Our_Products/UPPERCUT.aspx
(b) American Standard WaterSense Dual Flush toilet (Source: http://www.americanstandardus.com/searchResults.aspx?d=1&t=3&a=1)

- Automatic sensors can be incorporated with dual flush toilets to enhance water efficiency strategies.

Design Notes

User Education

- Dual flush toilets are interactive and require user comprehension and participation in order for the process to work properly

Related Technologies

Dual flush toilets can be combined with automatic sensors.

References/Useful Resources:

[1] EPA WaterSense. Accessed August 2010 at http://www.epa.gov/watersense/index.html

[2] Toolbase Services. Accessed August 2010 at http://www.toolbase.org/Technology-Inventory/Plumbing/high-effeciency-toilet

[3] Alliance for Water Efficiency. Accessed August 2010 at http://allianceforwaterefficiency.org/toilet_fixtures.aspx

Environmental Impacts

Water Efficiency

- Contributes to a decrease in water usage and water cost, which in turn promotes a more sustainable environment. Using water more efficiently helps maintain reservoirs and groundwater levels.

Guiding Principles[1]

Water Use Reduction (Water Efficiency)

- Employ strategies that in aggregate use 20percent less water than the water use baseline calculated for the building.
- Specify EPA's WaterSense-labeled products or other water conserving products, where available.

Associated LEED Credits (NC 2009)[2]

WEc3: Water Use Reduction (2-4 points)

- Reduce total building water use by a minimum of 20percent from baseline calculation. The baseline value for residential and commercial toilets is 1.6 gallons per flush (gpf).

Fixture	Water Use Baseline	Water Efficient Target	Units
Water closet	1.6	1.1 - 1.28	Gallons per flush
Commercial lavatory faucets	0.5	0.5	Gallons per minute
Residential lavatory faucets	2.2	0.5 - 1	Gallons per minute
Commercial prerinse spray val	1.6	TBD	Gallons per minute
Residential kitchen faucet	2.2	1.5 - 2.2	Gallons per minute
Residential showerheads	2.5	1.5	Gallons per minute

[1] Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings www.wbdg.org/pdfs/hpsb_guidance.pdf

[2] USGBC LEED Reference Guide for Green Building Design and Construction, 2009 Edition

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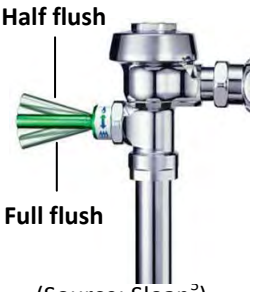
[PRODUCT AND ECONOMICS]

Product Images

(Source: Kohler[3])

(Source: Kohler)

(Source: Sloan[4])



(Source: Sloan[5])

Components

Dual Flush Toilet, Flush Valve (when applicable), Toilet Seat (when applicable)

Cost Range

Components	Cost	Unit
Dual Flush Toilet	Up to $600	per toilet
Flush Valve (manual)	$60-$90	per valve (retrofit)
Flush Valve (manual)	$170-$210	Per valve (new installation)
Flush Valve (automatic)	$550-$650	per valve
Toilet Seat	$30-$50	per seat

Product Types

Gravity-Flow Flush

- The force of gravity is utilized to pull or siphon water and waste out of the toilet.
- Water stored in the tank is released when the flush lever is activated.

Power Assisted

- Systems utilize a motorized pump that provides a uniform flush
- Tank-less designs possible
- Some noise associated with the motor use

Vendors

Kohler Persuade® Two-Piece Elongated Toilet
http://www.us.kohler.com/onlinecatalog/detail.jsp?from=thumb&frm=&module=WaterSense&item=13118302&prod_num=3654&section=2&category=13&resultPage=0--1706366092

American Standard FloWise™ Dual Flush Elongated Toilet
http://www.americanstandard-us.com/toilets/flowise-dual-flush-elongated-toilet/

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[3] Kohler Persuade® two-piece elongated toilet
http://www.us.kohler.com/onlinecatalog/detail.jsp?item=13118302&section=2&category=13&subcategory=117

[4] Sloan ECOS® Hardwire Flushometers
http://www.sloanvalve.com/Our_Products/ECOS_exposed_hardwire_water_closet_electronic_dual_flush_flushometer.aspx

[5] Sloan UPPERCUT® Manual Dual-Flush Flushometer http://www.sloanvalve.com/Our_Products/UPPERCUT.aspx

	Caroma USA Sydney 270 Elongated http://www.caromausa.com/Sydney-270-Elongated
Warranty Info	**Varies, dependent on brand.**
Code Restrictions	**None**

GENERAL[6]

Products included:

- Water closets
- Accessories

WATER CLOSETS

Water flow and consumption rates for plumbing fixtures:

A. Comply with requirements in Public Law 102-486, Energy Policy Act.

B. WaterSense labeled products for High-Efficiency Toilets - Tank-Type Dual Flush.

Water closets: WaterSense labeled high-efficiency toilet with maximum effective flush volume of 1.28 gallons. For dual flush toilets, the effective flush volume is the composite, average flush volume of two reduced flushes and one full flush per ASME A112.19.2 and ASME 112.19.14. [Note: This Specification addresses toilets typically found in homes, and in light commercial settings, such as hotels and restaurants. It does not address valve-type commercial toilets typically found in public restrooms (e.g., airports, theaters, arenas, schools) or composting toilets, both of which have different designs, patterns of use, and performance requirements.]

ACCESSORIES

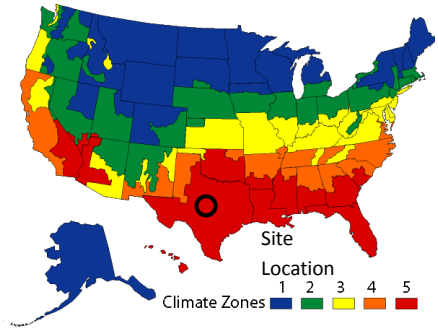
A. Labels: Provide labels for sensor operators at flush valves. Include the following information on each label:

1. The identification of the sensor and its operation with written description.
2. Range of sensor.
3. For battery operated units, the battery replacement schedule.

[6] Specification language modified from the Whole Building Design Guide's *Federal Green Construction Guide for Specifiers,* Section 22 40 00 (15400) Plumbing Fixtures. Accessed August 2010 at http://www.wbdg.org/ccb/browse_org.php?o=84 (last updated January 2010).

The Hilton Palacio del Rio Hotel

San Antonio, Texas



Facility

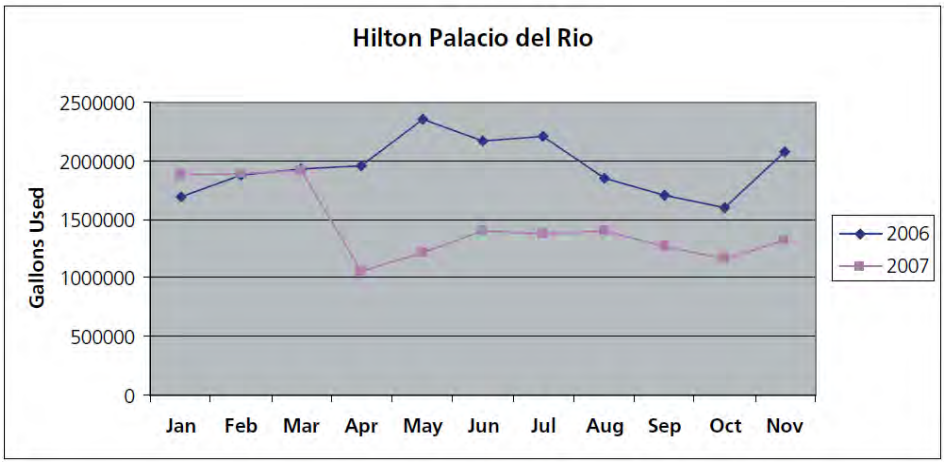
- The Hilton Palacio contains over 480 guestrooms and caters to a variety of visitors, from businessmen to tourists.
- Each toilet within the hotel was previously a 5 gallon, single flush unit that contributed to high monthly water consumption and costs. Maintenance-related issues (i.e. blocking, overflow, etc.) were also high.
- Located in the City of San Antonio, the hotel faced year-round water restrictions due to low levels of rainfall. A solution was needed to conserve water for both environmental benefits and cost savings.

Approach

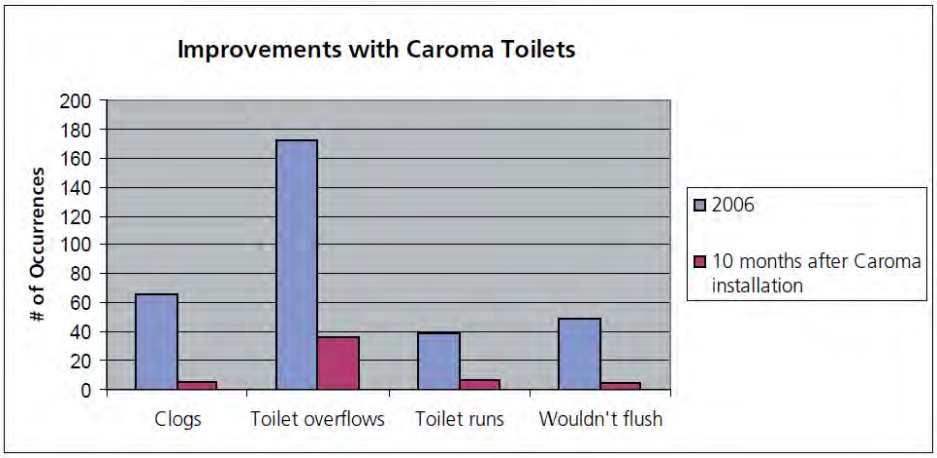
- Replaced 470 existing 5 gallon, single flush toilet units with high efficiency dual flush toilet units to reduce water consumption and maintenance problems.

Results

- During the first 8 months after the dual flush toilets were installed, the hotel saved nearly 6 million gallons of water, which equated to an approximate 35 percent reduction in monthly water use.
- Guest complaints about toilet problems reduced by more than 90percent. Maintenance calls reduced by more than 80percent.



Overall water usage in 2006 and 2007



Significantly less maintenance after installation
(Source: Carmona USA)[7]

[7] Caroma USA. Hilton Palacio: Conserving Vital Water Resources for San Antonio. Accessed August 2010 at http://www.caromausa.com/site_assets/www.caromausa.com/images/dynamic/pdf/Hilton-SAWS-case-study.pdf