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## WE 3: Indoor Water Use

### Intent

Minimize indoor demand for water through water-efficient fixtures and fittings.

### Requirements

#### Prerequisites

None.

#### Credits

*Note: Compensating shower valves and conventional, non-compensating shower valves may not work properly when low-flow showerheads (restricting water flow below 2.5 gpm) are installed. Installing low-flow showerheads where compensating valves or conventional, non-compensating valves are installed can increase the risk of scalding (or other types of injuries, such as slips and falls due to thermal shock) when the plumbing system experiences pressure changes. Make sure any low-flow showerhead is installed with a valve that has been designed, tested, and verified to function safely at the reduced flow rate. If in doubt, consult the manufacturer of the valve before installing a low-flow showerhead.*

#### 3.1 High-Efficiency Fixtures and Fittings (1 point each, maximum 3 points).

Meet one or more of the following requirements by installing high-efficiency (low-flow) fixtures or fittings. A project cannot earn points in both WE 3.1 and WE 3.2 for the same fixture type (e.g., faucet, shower, or toilet).

- a) The average flow rate for all lavatory faucets must be  $\leq 2.0$  gpm.
- b) The average flow rate for all showers must be  $\leq 2.0$  gpm per stall.
- c) The average flow rate for all toilets must be  $\leq 1.3$  gpf

OR

toilets must be dual-flush and meet the requirements of ASME A112.19.14

OR

toilets must meet the U.S. EPA WaterSense specification and be certified and labeled accordingly.

#### 3.2 Very High Efficiency Fixtures and Fittings (2 points each, maximum 6 points).

Meet one or more of the following requirements by installing very high efficiency fixtures or fittings. A project cannot earn points in both WE 3.1 and WE 3.2 for the same fixture type (e.g., faucet, shower, or toilet).

- a) The average flow rate for all lavatory faucets must be  $\leq 1.5$  gpm

OR

lavatory faucets must meet the U.S. EPA WaterSense specification and be certified and labeled accordingly.

- b) The average flow rate for all showers must be  $\leq 1.75$  gpm per stall.
- c) The average flow rate for all toilets must be  $\leq 1.1$  gpf.



## **WE 3.1 High-Efficiency Fixtures and Fittings**

## **WE 3.2 Very High Efficiency Fixtures and Fittings**

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Faucets, showers, baths, and toilets typically account for two-thirds of a home's indoor water use and one-third of its total water use. Installing high-efficiency fixtures and fittings is an easy strategy for reducing indoor water use: the most efficient fixtures and fittings use less than half the water of the conventional alternatives. High-efficiency fixtures and fittings can also significantly reduce the energy demand associated with domestic water heating. Since indoor water use varies with occupancy, the actual water and energy savings will depend on the number of occupants in the home, as well as water use habits.

Kitchen faucets are not included in this credit because studies have shown that most water consumption in the kitchen is volume-based (e.g., filling glasses or pots). Low-flow faucets installed in a kitchen only increase the amount of time required to complete a filling task.

This credit rewards installation of either high-efficiency or very high efficiency fixtures and fittings in bathrooms.

### **Approach and Implementation**

High-efficiency fixtures and fittings are sold side-by-side with conventional fixtures and fittings. From the consumer standpoint, they generally look and operate the same way as conventional fixtures and fittings but use less water and have a lower rated water use in gallons per minute (gpm) or gallons per flush (gpf). Low-flow faucets achieve savings through the use of aerators, which combine air with water to give the user the feeling of an equivalent water pressure but with less water.

Low-flow showerheads, especially those with flow volumes of less than 1.75 gpm, should be installed with proper thermostatic mixing valves that have been designed, tested, and verified to function safely at the reduced flow rate. The use of conventional or compensating shower valves can increase the risk of scalding when the plumbing system experiences pressure changes. Study showerhead manufacturers' information on the performance of the high-efficiency and very high efficiency showerheads (including testing for scalding and thermal shock) before making a selection.

High-efficiency toilets (HETs) have an average or effective flush volume of 1.28 gallons or less. HETs generally accomplish this by employing improved hydraulic designs, improved technologies, better valving, and in some cases smaller tanks. Some HET designs include multiple flush settings or pressure assistance to reduce water demand. For example, dual-flush toilets have a normal flush rate for solid waste but a much reduced flush rate for liquid waste. Pressure-assist toilets achieve the highest water efficiency by using pressure rather than gravity to remove the waste.

Not all high-efficiency toilets operate equally well, and poor design can lead to ineffective flushing and the need for multiple flushes. The U.S. Environmental Protection Agency's WaterSense program certifies toilets that achieve both water efficiency and operational effectiveness. The WaterSense label identifies high-efficiency products that have been verified for performance. WaterSense currently has a specification for high-efficiency toilets; a specification for bathroom faucets is under development.

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Low-flow showerheads and faucets will reduce both the hot water consumption and the rate at which hot water reaches the fixtures. If low-flow showerheads and faucets are installed, a smaller water heater and smaller-diameter piping can be used. To make up for the lower flow rate associated with low-flow showerheads and faucets, design the water distribution system to be compact (EA 7.1).

If the home will use any graywater or recycled water indoors, consider its quality in fixture selection. Determine whether manufacturers have set minimum supply water quality standards for specific fixtures and fittings. If rainwater or graywater will be used with plumbing fixtures and fittings designed for municipally supplied potable water, verify that the supply water quality is acceptable and will not compromise long-term fixture performance or void the manufacturer's warranty.

### Calculations

If a project includes multiple fixtures and fittings with different efficiencies, use a straight-line average to determine the overall average efficiency of each fixture type. For example, if two lavatory faucets have flow rates of 1.5 gpm and a third is rated for 2.1 gpm, the average overall flow rate is equal to  $(1.5 + 1.5 + 2.1) \div 3$ , or 1.7 gallons per minute. For the purposes of this calculation, all dual-flush toilets should be treated as 1.25 gallons per minute, or the high-flow volume, whichever is lower.

## Verification and Submittals

### Trade (e.g., plumber):

- Deliver any equipment literature (e.g., user manuals, brochures, specifications) related to the fixtures and fittings to the builder or project team leader.

### Builder / Project Team:

- Include any equipment literature in the occupant's operations and maintenance manual.

### Green Rater:

- Visually verify that all fixtures and fittings meet the appropriate requirements.

## Exemplary Performance

Projects that can demonstrate flow rates that are substantially lower than those in WE 3.2 can earn 1 additional point, to be counted under Innovation & Design 3. This application must be submitted by the Provider and approved by USGBC before the point can be counted.

## Considerations

### Economic Issues

State and local water authorities may provide incentives or rebates for high-efficiency fixtures and fittings. In some cases, these programs cover the entire additional cost of high-efficiency alternatives.

High-efficiency fixtures and fittings will save the occupants money on utility costs for water and water heating over the life of the home.

### Regional Variances

Water conservation has become increasingly important in certain parts of the country, and some local water authorities require indoor water conservation measures. A project that uses measures

as part of code compliance is still eligible to earn LEED points.

## Resources

Please see the USGBC Web site, at [www.usgbc.org/resources](http://www.usgbc.org/resources), for more specific resources on materials sources and other technical information.

## Web Sites

### Maximum Performance (MaP™) TESTING California Urban Water Conservation Council

[www.cuwcc.org/maptesting.lasso](http://www.cuwcc.org/maptesting.lasso)

The Maximum Performance (MaP™) testing project was initiated in 2003 to test toilet models' performance. This testing protocol simulates real-world use to help consumers identify high-efficiency toilets that not only save water but also work well. The current MaP testing report provides performance information on 470 toilet models. This site provides access to the complete listings of the tested toilets.

### California Urban Water Conservation Council Product News

[www.cuwcc.org/products\\_tech.lasso](http://www.cuwcc.org/products_tech.lasso)

This site provides a variety of information on toilets, urinals, faucets, and showerheads, including high-efficiency models, state and national standards, and other essentials for choosing the right fixtures and fittings.

### Choosing a Toilet

[www.taunton.com/finehomebuilding/pages/h00042.asp](http://www.taunton.com/finehomebuilding/pages/h00042.asp)

This Fine Homebuilding article includes several varieties of water-efficient toilets.

### Composting Toilet Reviews

[www.buildinggreen.com/features/mr/waste.html](http://www.buildinggreen.com/features/mr/waste.html)

An Environmental Building News article discusses commercial composting toilets.

### Terry Love's Consumer Toilet Reports

[www.terrylove.com/crtoilet.htm](http://www.terrylove.com/crtoilet.htm)

This Web site offers a plumber's perspective on many of the major low-flow and composting toilets used in commercial and residential applications.

### Water Closet Performance Testing

[www.ebmud.com/conserving\\_&\\_recycling/toilet\\_test\\_report/default.htm](http://www.ebmud.com/conserving_&_recycling/toilet_test_report/default.htm)

This site provides two reports on independent test results for flush performance and reliability for a variety of toilets.

### U.S. EPA's WaterSense<sup>SM</sup> Program

[www.epa.gov/owm/water-efficiency](http://www.epa.gov/owm/water-efficiency)

This Web site provides an overview of the U.S. Environmental Protection Agency's WaterSense water-use efficiency program and information about EPA WaterSense-labeled high-efficiency toilets and bathroom sink faucets.

### Water Use It Wisely

[www.wateruseitwisely.com/toolsLinks/index.shtml](http://www.wateruseitwisely.com/toolsLinks/index.shtml)

This site provides extensive lists of links and related resources concerning water conservation in addition to a series of links to plumbing fixture and faucet resources and sites. Scroll down to the "Fixtures and Appliances" section of links and resources.

### Water Wiser: The Water Efficiency Clearinghouse

[www.awwa.org/waterwiser](http://www.awwa.org/waterwiser)

This web clearinghouse provides articles, reference materials, and papers on all forms of water efficiency.

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