

Low Flow Showerheads

[STRATEGY]

BRIEF DESCRIPTION

The U.S. Energy Policy Act of 1992 requires that all faucet fixtures manufactured in the United States restrict maximum water flow at or below 2.5 gallons per minute (gpm). Low-flow showerheads are designed to operate within 1.5 gallons of water per minute. To be more efficient, water droplet size and direction is controlled to help reduce and focus the water flow. Low-flow showerheads do not reduce water pressure; instead they restrict flow by forcing water through small apertures which increases the velocity of the water. Low-flow showerheads are designed to be as effective as conventional showerheads.

An innovative showerhead that uses 1.0 gpm at a standard water pressure of 50 pounds per square inch showerhead has been used by troops in Iraq. Currently this technology is only available through one vendor

(http://www.thenaturalabode.com/mm5/merchant.mvc?Screen=PROD&Product_Code=4894).

Applications Barracks, Residential Settings, Hotels, Office Buildings, Community Centers, Gymnasiums, Hospitals

- For use in all locker rooms and restrooms where showers are utilized.



(a)



(b)

(a) Low-Flow Showerhead (Source:

http://www.us.kohler.com/onlinecatalog/product_result.jsp?module=Showerheads&category=12&subcategory=121)

(b) Locker Room Showers (Source:

http://www.spiecelmc.com/spiece_fitness/amenities_and_services.php)

- Design and installation of low-flow showerheads is similar to that of conventional showerheads, requiring no special connections or fittings

Design Notes Hot Water

- Lower flow of water can increase the amount of time it takes for hot water to reach the fixture.

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- Problem can be minimized by placing the hot water heater closer to the end use and utilizing smaller pipe diameters.

Maintenance

- The use of smaller water emitting openings may cause low-flow showerheads to clog with debris or mineral deposits more often than conventional showerheads.
- More frequent cleaning will help reduce any debris or mineral build-ups.

Related Technologies **None.**

References/Useful Resources:

[1] U.S. Department of Energy http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13050

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

Low-Flow Showerheads

[ENERGY AND ENVIRONMENT]

Energy Savings

Energy Efficiency

- Yields a reduction in energy to deliver and treat water. Less hot water is required, which results in less required energy consumption for heating hot water.

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 Principles¹

Water Use Reduction (Water Efficiency)

- Employ strategies that in aggregate use 20 percent 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

Optimize Energy Performance (Energy Efficiency)

- Reduce the energy use by 30 percent compared to the baseline building performance rating per ASHRAE Standard 90.1-2007.WEc3: Water Use Reduction (2-4 points)

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- Reduce total building water use by a minimum of 20 percent from baseline calculation. The baseline value for residential showerheads is 2.5 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 valve | 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

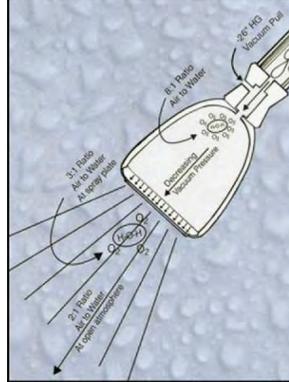
Low Flow Showerheads

[PRODUCT AND ECONOMICS]

Product Images



(Source: American Standard³)



(Source: Bricor⁴)



(Source: Delta Faucet⁵)

Components Low-Flow Showerhead

Cost Range

| Components | Cost | Unit |
|---------------------|--------------|----------------|
| Low-Flow Showerhead | \$50 – \$200 | per showerhead |

Product Types

Aerating Showerhead

- Mixes air into the water stream, reducing flow of water while increasing efficiency.
- Distributes less water over a greater area.
- Because air is mixed in with the water, the water temperature may cool more quickly than non-aerating showerheads.

Non-Aerating Showerhead

- Water flow control technology varies the size and pattern of the water droplets to maintain the force of the spray while minimizing overall water flow.
- Maintains a consistent water temperature.

Laminar Flow Showerhead

- Forms individual, parallel streams of water.
- Water flows in a smooth, solid-looking stream which reduces overall splashing.

Vacuum Chamber Showerhead

- Patented vacuum chamber aerates and compacts water using vacuum pressure to create an intense blast of water resulting in a powerful stream of water for the user.
- Force of vacuum booster valve increases water stream impact intensity by 2.5

³ <http://www.americanstandard-us.com/products/productDetail.aspx?id=1918>

⁴ <http://www.bricor.com/tech.htm>

⁵ <http://www.deltafaucet.com/bath/details/RP54752.html>

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times over conventional streams.

| | |
|--------------------------|---|
| Simple Pay Back | Less than 1 year , depending on number of showerheads, amount of uses per day, days used per week, water and sewer cost, and water volume. |
| Vendors | American Standard FloWise® Water Saving Showerhead http://www.americanstandard-us.com/products/productDetail.aspx?id=1918 Moen Eco-performance Showerhead http://www.moen.com/moen/chrome-eco-performance-showerhead/_R-CONSUMER%3A6306 Delta Traditional Water-Efficient Showerhead http://www.deltafaucet.com/bath/details/RP54752.html Bricor http://www.bricor.com/prod.htm |
| Warranty Info | Vary, depending on brand. |
| Code Restrictions | None. |

Low Flow Showerheads

[SPECIFICATIONS]

GENERAL⁶

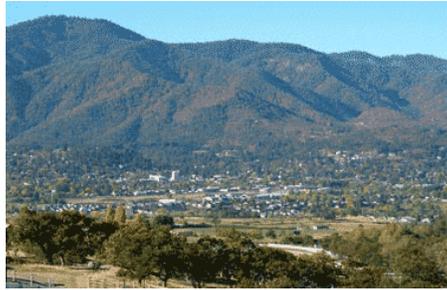
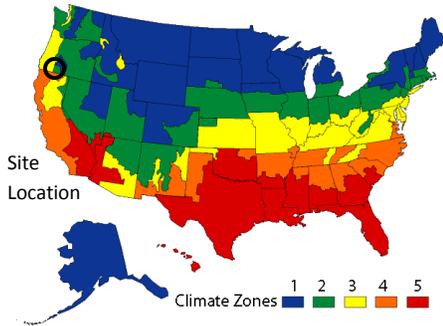
- A. Water flow and consumption rates for plumbing fixtures:
 - 1. Comply with requirements in Public Law 102-486, Energy Policy Act.
 - 2. Provide WaterSense labeled products for Showerheads.

- B. Fixtures:
 - 1. Water management: Provide low flow fixtures.
 - a. Showerheads: WaterSense labeled. Maximum flow rate shall not exceed 1.5 gal/min (7.6 L/min) when measured at a flowing water pressure of 80 psi.

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).

City of Ashland

Ashland, Oregon



Facility

- Ashland, Oregon is a city with a population of about 20,000 people.
- At the time of the study, average water treatment was 6.5 million gallons per day in the summer and 2.5 million gallons of water per day in the winter, which equated to an annual usage was approximately 150 gallons of water per capita per day.

Approach

- Implemented a four-point water efficiency program to address its water supply problem in 1991.
- The Four-point program included (1) system leak detection and repair, (2) conservation-based water rates, (3) high-efficiency showerhead replacements, and (4) toilet retrofits and replacements.

Results

- By 2001, almost 85 percent of audited homes had participated in the showerhead and/or toilet replacement programs.
- Ashland reduced its water demand by 395,000 gallons per day.
- The city experienced an estimated annual energy savings of 514,000 kilowatt-hours of electricity, largely due to reduced hot water use from using the more efficient showerheads.

References/Useful Resources:

[1] U.S. Environmental Protection Agency, *Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs*, http://www.epa.gov/watersense/docs/utilityconservation_508.pdf