Low-Flow Fixtures and Fittings

What are Low-Flow Fixtures and Fittings?

Low-flow equipment includes special types of fixtures applied to plumbing appliances such as faucets, toilets, and showerheads. These fixtures help to reduce consumption of water, a critical resource. Toilets use more water in the home than any other appliance or fixture.¹ Existing federal standards require that new or replacement toilets use no more than 1.6 gallons per flush² compared to the conventional toilet flush of 3.5 gallons while high efficiency toilets (HET’s) receiving the WaterSense label use an average of 20% less than the federal standard or about 1.28 gallons.³

Faucets account for more than 15% of indoor home water use.⁴ WaterSense lavatory faucets require a maximum of 1.5 gallons per minute (gpm) at 60 pounds per square inch (psi) and a minimum of .8 at 20 psi to ensure consumer satisfaction.⁵ Aerators are supplementary fittings to faucets and showerheads that can also reduce water flow by as much as 40% while, at the same time, maintaining desirable water pressure.⁶ Faucet aerators can be one of the most cost-effective water conservation measures, some with shut off valves to stop the flow without affecting temperature. New kitchen aerators should use no more than 2.2 gallons per minute (gpm) and new bathroom faucet aerators restrict the flow from 1.5 to .5 gpm.⁷

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Showerheads should have a flow of no more than 2.5 gpm compared to the standard average of four or five gallons per minute and are usually one of two types. The aerating type mixes air with water to produce a misty spray while the laminar-flow type forms individual streams of water. These fixtures also save energy and reduce utility bills.

How to Implement Low-Flow Fixtures

Installing low-flow fixtures is very similar to installing conventional fixtures. Showerheads and faucets are relatively easy to install and may be done by the homeowner. Other fixtures such as toilets may require a professional plumber for installation. In the past, low-flow toilets generated complaints regarding trouble clearing the bowl and clogging, but flushing performance has improved significantly in order to compete with traditional toilets. Low-flow toilets offer a variety of designs to enhance functionality, including large drain passages, redesigned bowls, and tanks for easier washdown. In addition, these fixtures have enhancements to the conventional gravity system with water supply line pressure, compressed air, or vacuum pumps. These variations to the gravity system are known as dual-flush, pressure assist, and power assist toilets, respectively. Pressure assist toilets are the noisiest and require at least 25 pounds of water pressure psi. Capacity for these toilets ranges from .8 to 1.6 gallons per flush.

Aerator showerheads tend to create more steam and moisture and so consumers in humid climates might prefer laminar-flow showerhead to produce less moisture. Purchase aerators that have flow rates of 1.0 gpm or less.

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It is easy to find water efficient products in most hardware stores and to research products at US EPA’s Partnership Program WaterSense. Products should also be individually researched and evaluated for performance, warrantee, etc. as quality varies with model and manufacturer.

Table 1 - Rates and/or Effects of Low-Flow Fixtures

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-flow faucet</td>
<td>2.5 gallons per minute or less</td>
</tr>
<tr>
<td>Low-flow sink aerator</td>
<td>reduce flow to 1.0 gallon/minute or less</td>
</tr>
<tr>
<td>Low-flow toilet</td>
<td>reduce flow to 1.3 gallons/flush (conventionally 3.5 - 7.0 gallons/flush)(^\text{14})</td>
</tr>
<tr>
<td>Dual-flush toilet</td>
<td>0.8 or 1.6 gallons/flush</td>
</tr>
<tr>
<td>Showerhead</td>
<td>2.5 gallons per minute or less</td>
</tr>
</tbody>
</table>

Example

The U.S. General Accounting Office gathered data from several studies including those initiated by the American Water Works Association and the US EPA and found that low-flow toilets used about 40 percent less water for flushing than conventional toilets. These results were based on studying homes across the country.\(^\text{15}\)

Benefits

- Saves money on water bill
- Saves resources including water, energy, and labor\(^\text{16}\)
- Reduces impact on the environment by reducing wastewater, stormwater runoff, untreated sewage, and use of chemical treatment
- Saves money on water treatment plant and infrastructure while extending infrastructure life by reducing water volumes\(^\text{17,18}\)

\(^{14}\) As of 1995, NEPA updated plumbing codes, requiring toilets to not exceed 1.6 gallons/flush.
Costs

Low-flow fixtures may be slightly more expensive than conventional fixtures, but the savings reflected on the water bill due to their increased efficiency outweighs this initial cost. Low-flow fixtures reduce overall water use and when hot water is used, they also lower water heating costs by using less hot water in buildings. Low-flush toilets can be purchased for anywhere from $100-$1000 each, depending on type and style\(^\text{19}\) and can result in water savings of 25%- 60%.\(^\text{20}\)

For electric water heating applications, selecting a WaterSense labeled faucet at a flow rate of 1.5 gpm will have a combined energy and water cost savings per faucet of $330 over an estimated 10-year life expectancy compared to the base model. For gas water heating applications, selecting a WaterSense labeled faucet with a flow rate of 1.5 gpm will have a combined energy and water cost savings per faucet of $268 over an estimated 10-year life expectancy compared to the base model.\(^\text{21}\)

Resources

http://www1.eere.energy.gov/femp/technologies/eep_faucets_showerheads_calc.html

US EPA WaterSense Program
http://www.epa.gov/watersense/index.html

US EPA: How To Conserve Water and Use it Effectively
http://water.epa.gov/polwaste/nps/nps-conserve.cfm

US EPA Water efficient products with a WaterSense Label
http://www.epa.gov/watersense/products/index.html

US EPA WaterSense Water Savings Calculator
http://www.epa.gov/watersense/calculate_your_water_savings.html

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American Water – NJ: The Water Leak Detection Kit

Ultra-Low Flush Toilets, A Massachusetts Water Resources Authority Publication
http://www.mwra.state.ma.us/publications/ulftoilets.pdf