High Efficiency Toilets [HETs]

BRIEF DESCRIPTION
Physically resembling industry standard toilets, high efficiency toilets (HETs) assist in reducing water usage. These toilets average anywhere from 0.8 to 1.28 gallons of water per flush, using at least 20 percent less water than mandated by the U.S. Energy Policy Act of 1992. HETs certified under the Environmental Protection Agency’s (EPA) WaterSense program must use no more than an average flush volume of 1.1 gallons. Recent advances in flushing technology allow HETs to remove waste with less water by increasing water velocity.

Applications

- Locker Rooms, Restrooms
  - For use in all locker rooms and restrooms where toilets are utilized.

![High-Efficiency Toilet](http://www.americanstandard-us.com/innovations/innovationDetail.aspx?f=2)

  - HETs are designed to replace any industry standard toilet in any location.
  - Dual flush valves and automatic sensors can be incorporated with HETs to enhance water efficiency strategies.

Design Notes

- User Education
  - HETs cannot accommodate extraneous waste materials.
  - New models have larger trap sizes and eliminate choke points to ensure clog free operation.

Related Technologies

- HETs can be combined with dual flush valves or automatic sensors.

References/Useful Resources:

High-Efficiency Toilets (HETs)

[ENERGY AND ENVIRONMENT]

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

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)

WEc3: Water Use Reduction (2-4 points)
- Reduce total building water use by a minimum of 20 percent from baseline calculation. The baseline value for residential and commercial toilets is 1.6 gallons per flush (gpf).

<table>
<thead>
<tr>
<th>Fixture</th>
<th>Water Use Baseline</th>
<th>Water Efficient Target</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water closet</td>
<td>1.6</td>
<td>1.1 - 1.28</td>
<td>Gallons per flush</td>
</tr>
<tr>
<td>Commercial lavatory faucets</td>
<td>0.5</td>
<td>0.5</td>
<td>Gallons per minute</td>
</tr>
<tr>
<td>Residential lavatory faucets</td>
<td>2.2</td>
<td>0.5 - 1</td>
<td>Gallons per minute</td>
</tr>
<tr>
<td>Commercial prerinse spray val</td>
<td>1.6</td>
<td>TBD</td>
<td>Gallons per minute</td>
</tr>
<tr>
<td>Residential kitchen faucet</td>
<td>2.2</td>
<td>1.5 - 2.2</td>
<td>Gallons per minute</td>
</tr>
<tr>
<td>Residential showerheads</td>
<td>2.5</td>
<td>1.5</td>
<td>Gallons per minute</td>
</tr>
</tbody>
</table>

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


These TechNotes are intended to provide general information for the consideration of design strategies. The TechNotes should NOT be interpreted as an endorsement of any specific product or technology.
**High Efficiency Toilets [HETs]**

**[PRODUCT AND ECONOMICS]**

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**Product Images**

- (Source: Kohler)
- (Source: American Standard)
- (Source: American Standard)

**Components**

- **Toilet, Flush Valve (when applicable), Toilet Seat (when applicable)**

**Cost Range**

<table>
<thead>
<tr>
<th>Components</th>
<th>Cost</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Efficiency Toilet</td>
<td>$200 – $800</td>
<td>per toilet</td>
</tr>
<tr>
<td>Flush Valve (manual)</td>
<td>$150 – $250</td>
<td>per valve</td>
</tr>
<tr>
<td>Flush Valve (automatic)</td>
<td>$450 – $550</td>
<td>per valve</td>
</tr>
<tr>
<td>Toilet Seat</td>
<td>$50</td>
<td>per seat</td>
</tr>
</tbody>
</table>

**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.

- **Pressure Assisted Flush**
  - Either water line pressure or a device in the tank is utilized to create additional force from air pressure to flush the toilet.
  - Instead of falling by the force of gravity, water is forced out of the tank with the added pressure from compressed air, creating a pressurized stream of water that clears the waste.
  - More expensive but potentially more effective.

**Vendors**

- **American Standard** Cadet® 3 FloWise™ Round Front Toilet

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6. Price varies by brand. The 0.8 GPF model usually costs more than the 1.28 GPF model.

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### High Efficiency Toilets [HETs]

**[PRODUCT AND ECONOMICS]**

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Warranty Info</th>
<th>Code Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kohler Wellworth® 1.28 gpf round-front toilet with Class Five® flushing technology and left-hand trip lever</strong></td>
<td>K-3577</td>
<td>Kohler</td>
<td>3577</td>
<td>Varies, depending on brand.</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><a href="http://www.us.kohler.com/onlinestore/detail.jsp?from=thumb&amp;frm=&amp;module=Toilets&amp;item=13570502&amp;prod_num=3577&amp;section=2&amp;category=13">http://www.us.kohler.com/onlinestore/detail.jsp?from=thumb&amp;frm=&amp;module=Toilets&amp;item=13570502&amp;prod_num=3577&amp;section=2&amp;category=13</a></td>
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</tr>
</tbody>
</table>

Warranty Info

Varies, depending on brand.

Code Restrictions

None
High Efficiency Toilets [HETs]

SPECIFICATIONS

GENERAL

Products included:
- Water closets
- Accessories

WATER CLOSETS

Water flow and consumption rates for plumbing fixtures:

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

Water closets: WaterSense labeled high-efficiency toilet with maximum effective flush volume of 1.1 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.]

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[CASE STUDY]

Parc 55 Union Square Hotel
San Francisco, California

Facility
- The Parc 55 Union Square Hotel houses over 1000 guest rooms, making it one of the largest hotels in San Francisco.
- All guest rooms were outfitted with 3.5 gallons per flush (gpf) gravity fed toilet fixtures at the time of construction in 1984.

Approach
- Beginning in 2007 and continuing through 2008, the hotel replaced all 3.5 gpf toilet fixtures with 1.0 gpf pressure-assist HETs at a rate of about 100 replacements per month.

Results
- Water consumption by hotel toilet fixtures reduced by over 25 percent per month.
- Maintenance calls regarding toilet fixtures issues decreased by over 50 percent

(Source: Koeller and Company and Veritec Consulting Inc.8)