

## Water Fixture Efficiency

### Water efficient technologies boost water savings

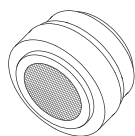
The commercial building sector accounts for 17 percent of public water use<sup>1</sup> (excluding irrigation), and the cost of water varies greatly by location. Since 2010, water and sewer rates on average have risen by 41 percent in 30 major U.S. cities.<sup>2</sup> Improving the efficiency of indoor and outdoor plumbing fixtures can yield significant water and cost savings, allowing building owners to reinvest capital into their businesses.

### Lower Cost Improvements

For facilities with frequent handwashing and shower usage, including residence halls, offices and educational buildings, making the following low cost improvements will result in immediate water savings:

- Install faucet flow aerators
- Flow restrictors
- Install low-flow shower heads
- Install low-flow pre-rinse spray valves
- Replace faucets
- Replace toilets/urinals

#### INSTALL FAUCET FLOW AERATORS



WaterSense faucet aerators deliver a mixture of water and air to reduce flow rates. They can cost less than a dollar each and can be screwed on to most existing sink faucets. The appropriate flow rate for each faucet will depend on the intended use of the faucet:

- Handwashing ~ 0.5 gallons per minute (GPM)
- Bathing and Dishwashing ~ 1.5 GPM
- Utility - No restrictor necessary, but consider adding a pre-rinse spray valve if the faucet is used for direct cleaning.

It is important to note that lower flow rates may lead to longer water heat-up times. Take this into account when choosing the appropriate aerator, and refer to the *Water Heating fact sheet* for additional water heating strategies.

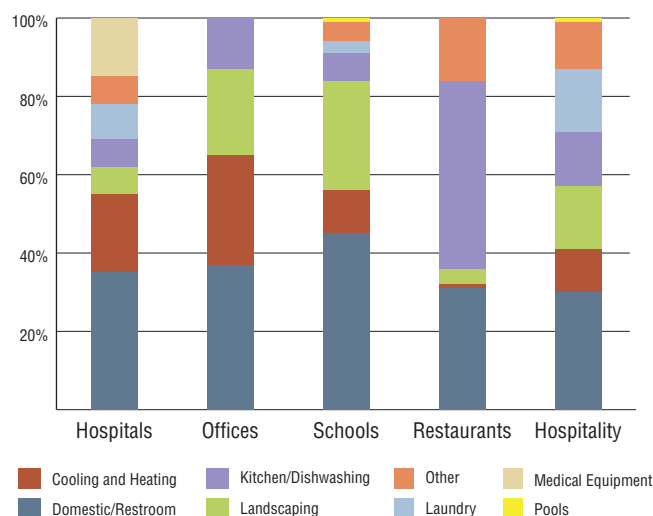
#### FLOW RESTRICTORS

In special applications where aerators are incompatible or prohibited, inline flow restrictors may be a cost effective alternative if permissible. Inline flow restrictors can be installed on hot and cold feed lines to limit the amount of water being delivered to a specific tap or shower head. Flow restrictors may also be helpful in multi-story buildings where water pressure varies from floor to floor.<sup>3</sup>



**WaterSense** labeled products are backed by an independent certification to verify high efficiency and performance, making the selection of high-efficiency water fixtures easy. To earn the label, WaterSense fixtures must not exceed a certain flow rate while meeting the same criterion for water pressure/distribution as standard fixtures. Ultra-efficient fixtures are also available that exceed the WaterSense threshold.

Water End-Use by Building Type, Source - WaterSense

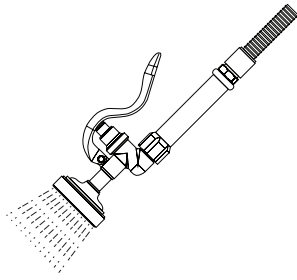


"Water efficiency upgrades at Asbury Harris Epworth Tower resulted in a 45 percent reduction in water usage – a savings equivalent to nearly 2.5 million gallons of water with an annual avoided cost of \$72,350."

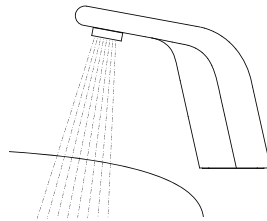
–Terry Barcroft, VP of Operations, Wesley Woods Senior Living



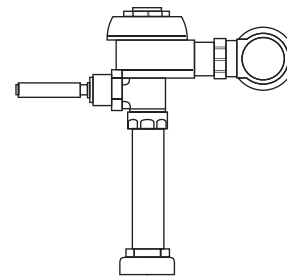
Low-flow shower head



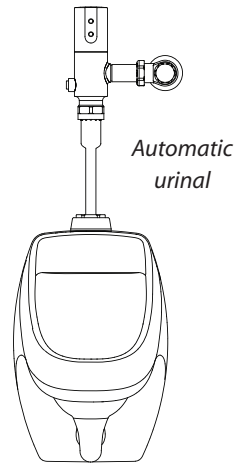
Pre-rinse spray valve



Automatic faucet



Low-flow flushometer valve



Automatic urinal

## INSTALL LOW-FLOW SHOWER HEADS

WaterSense labeled showerheads have flow rates, measured in gallons per minute (GPM), between 1.5 and 2.0 GPM, offering up to 40 percent savings over standard 2.5 GPM showerheads. This can equate to significant water savings in facilities with frequent shower use. A common misconception is that water efficient shower heads sacrifice performance for water efficiency. However, the WaterSense program was designed to weed out poor performers while maintaining water savings.<sup>4</sup>

## INSTALL LOW-FLOW PRE-RINSE SPRAY VALVES

Food service establishments in the United States use roughly 51 billion gallons of water a year rinsing dishes with pre-rinse spray valves. That is equivalent to one third of the water used in commercial kitchens.<sup>5</sup> WaterSense labeled pre-rinse spray valves (1.28 GPM) use 20 percent less water than federal standard, with no performance sacrifices.

## REPLACE FAUCETS

When replacing faucets, always look for the WaterSense label, ensuring a maximum flow rate of 1.5 GPM.

### Install Automatic Faucets

Automatic faucets are equipped with a battery or solar powered motion sensor that opens the faucet valve in response to the presence of a hand in close proximity. Public bathrooms with high volume hand washing can benefit greatly from motion sensing technologies as they cannot be left on for extended periods.

## REPLACE TOILETS/URINALS

### Low-Flow Tank Toilets

Tank toilets operate using gravity from a raised tank to dispense water and flush out waste. WaterSense labeled low-flow tank toilets are independently certified to



remove at least 350 grams of solid waste while using no more than 1.28 gallons per flush (GPF).<sup>6</sup> Some tank toilets are equipped with a dual-flush valve, which allows for a full flush as well as a reduced flush.

### Low-Flow Flushometer Toilets

Flushometer toilets operate using water pressure from the supply system rather than gravity from the tank. Older models use as much as three to seven gallons of water per flush, while newer WaterSense certified models use between 1.28 and 1.6 GPF. If all commercial buildings nationwide upgraded their older flushometer toilets to WaterSense certified toilets, it would save an estimated 39 billion gallons of water each year.<sup>7</sup> Flushometer toilets are also available in dual-flush models, which allow different flow rate options for solid and liquid waste. Existing toilets can be fitted with a dual flush conversion device. One drawback to flushometer toilets is they require considerable water pressure to function effectively.<sup>8</sup> Before installing, determine if your water supply system is equipped to handle the project.

### Low-Flow Urinals

A single employee could flush a urinal 780 times in a year.<sup>9</sup> WaterSense labeled flushing urinals use no more than 0.5 GPF. Replacing just one older, inefficient urinal with a WaterSense certified urinal could result in savings of 4,600 gallons per year in a typical office building.<sup>10</sup> Ultra-efficient urinals have recently entered the marketplace that use a mere pint per flush, resulting in an 87 percent reduction in water use when compared with a federal standard urinal (1.0 gpf).

### Waterless Urinals

Waterless urinals use cartridges filled with a liquid sealant to create a fluid and odor barrier between the sanitary sewage and the bathroom environment, eliminating the need for flush water and reducing operating costs. Most waterless urinals require the cartridges to be replaced four times per year.



## Automatic Toilets/Urinals

Automatic toilets are equipped with a battery or solar powered motion sensor that flushes the toilet in response to movement. Be mindful of the sensor's sensitivity to reduce the risk of "ghost flushing" when unintentional motion causes an unnecessary flush.

## Higher cost improvements

### RAIN WATER AND GREY WATER RECLAMATION

Rain water collected in a cistern and moderately soiled grey water from sinks, showers, tubs and laundry machines can be reused for toilet flushing and irrigation. Because grey water reclamation systems require diversion pipes to be installed on shower, sink or laundry drains, the level of involvement is relatively large and requires a professional plumber, especially if a treatment system is needed.

## Considerations

### LEAKS

Even with proper plumbing installation and robust commissioning, water leaks can still contribute to a large amount of your facility's water use. In fact, silent water leaks on average account for over six percent of a facility's total water use.<sup>11</sup> Monitoring your plumbing system for leaks is essential to maximizing savings from water efficiency projects. Train facilities staff to monitor for leaks once a month and have a designated technician on-call for repairs.

Some leak diagnoses are very simple and can be carried out by staff members. For example, to check for a leaky toilet, place a drop of food coloring in the tank. If the dye appears in the bowl after about ten minutes, you probably have a leaky toilet. However, most leaks will require the expertise of a professional plumber for diagnosis and repair.

## METERING OPTIONS

Water meters can be installed at the building level to track all water entering the building or submeters can track usage of subsystems such as cooling tower makeup and blowdown water or irrigation water.<sup>12</sup> Submetering can be advantageous for defraying some sewer utility fees. Various technologies are available. Meters can also be integrated with a web-based energy information system allowing for detailed water-usage analysis and leak notification.

### REFERENCES AND RESOURCES:

1. [www3.epa.gov/watersense/commercial/types.html#tabs-office](http://www3.epa.gov/watersense/commercial/types.html#tabs-office)
2. [www.circleofblue.org/waternews/2015/world/price-of-water-2015-up-6-percent-in-30-major-u-s-cities-41-percent-rise-since-2010/](http://www.circleofblue.org/waternews/2015/world/price-of-water-2015-up-6-percent-in-30-major-u-s-cities-41-percent-rise-since-2010/)
3. [www.watercorporation.com.au/~media/files/business/saving-water/water-saving-flow-regulating-devices.pdf](http://www.watercorporation.com.au/~media/files/business/saving-water/water-saving-flow-regulating-devices.pdf)
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