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WaterSense®

Conserving Hot Water Through Bath and Shower Diverter labeling

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Agenda

- Introduction to WaterSense
- Bath and Shower Diverter Background
- Notice of Intent (NOI) for Bath and Shower Diverters
 - Scope
 - Leak rate criteria
 - Performance criteria and product testing
 - Next steps

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Part 1:

Introduction to WaterSense



What Is WaterSense?

- Voluntary partnership and labeling program launched by EPA in 2006 designed to reduce municipal water use across the country
- Simple way for consumers to identify products that are water-efficient **and** perform well
- A label with integrity—products are independently certified
- Aims to increase the adoption of water-efficient products, homes, and programs by consumers and organizations



WaterSense Product Evaluation Factors

WaterSense uses several factors to determine which products to label. Products must:

- Offer equivalent or superior performance
- Be about 20 percent more water-efficient than standard models
- Realize water savings on a national level
- Provide measurable results
- Achieve water efficiency through several technological options
- Be effectively differentiated by the WaterSense label
- Be independently certified

WaterSense Labeled Products



**Flushing
Urinals**



**Lavatory
Faucets**



**Irrigation
Controllers**



**Tank-Type
Toilets**



Showerheads



**Pre-Rinse
Spray Valves**



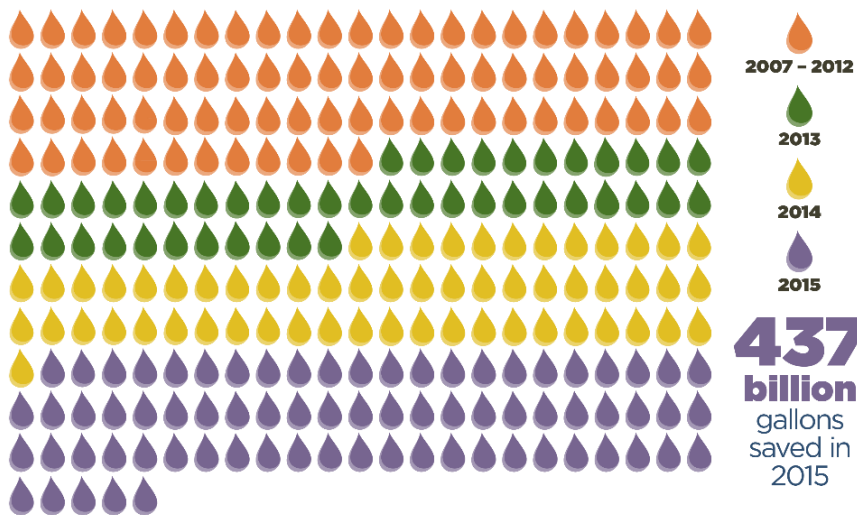
**Flushometer-Valve
Toilets**

**More than 21,000
product models have
earned the
WaterSense label**



Accomplishments

1.5 trillion gallons of water saved since 2006!

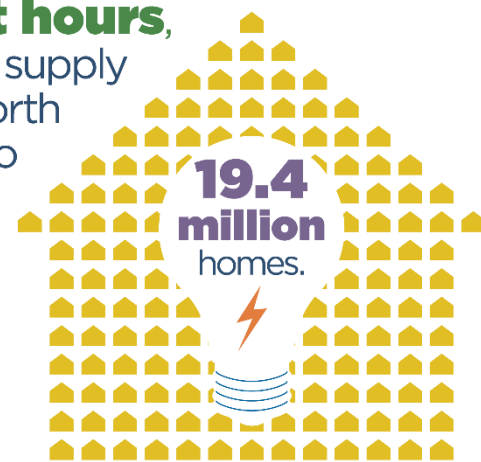


That's **more than** the amount of water used by all of the households in **California for a year!**

WaterSense has helped **reduce** the amount of **energy needed** to heat, pump, and treat water by

212 billion

kilowatt hours, enough to supply a year's worth of power to more than



WaterSense partners helped...



...**consumers save**

\$32.6 billion in water and energy bills

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Part 2:

Bath and Shower Diverter Background



Bath and Shower Diverter Background

- A device that diverts the flow of water either to the bath tub through the tub spout or to the showerhead.
- Commonly found in residential bathrooms and private commercial restrooms (e.g., hotels)



Tub Spout Diverters



Tub-to-shower Diverters

Bath and Shower Diverter Background

- These diverters can leak water through the tub spout when the entire flow should be diverted to the showerhead.
- Leakage occurs throughout the shower event
- Leak rates typically increase over the lifetime of the product
- Often leak hot water, resulting in water **and** energy waste



Bath and Shower Diverter Background

Existing performance/efficiency standards:

- **National:** *ASME A112.18.1/CSA B125.1 Plumbing Supply Fittings*
- **State:** California Energy Commission's (CEC) *Appliance Efficiency Regulations*

Standard	Pre-Life Cycle Leak Rate	Post-Life Cycle Leak Rate
ASME A112.18.1/ CSA B125.1	0.1 gpm	0.2 gpm
CEC Appliance Efficiency Regulations	0.01 gpm	0.05 gpm

Field Study: Taitem Engineering

- In 2011, Taitem Engineering, PC, LLC. assessed bath and shower diverter leaks for the New York State Homes and Community Renewal Agency.
- Examined 120 bath and shower diverters in residential apartment buildings:
 - 34 percent of diverters leaked more than 0.1 gpm
 - The largest leak observed was 3.0 gpm
 - The average of all leaks greater than 0.1 gpm was 0.8 gpm



Taitem Engineering, PC, 2011.
“Leaking Shower Diverters”

Field Study: Taitem Engineering

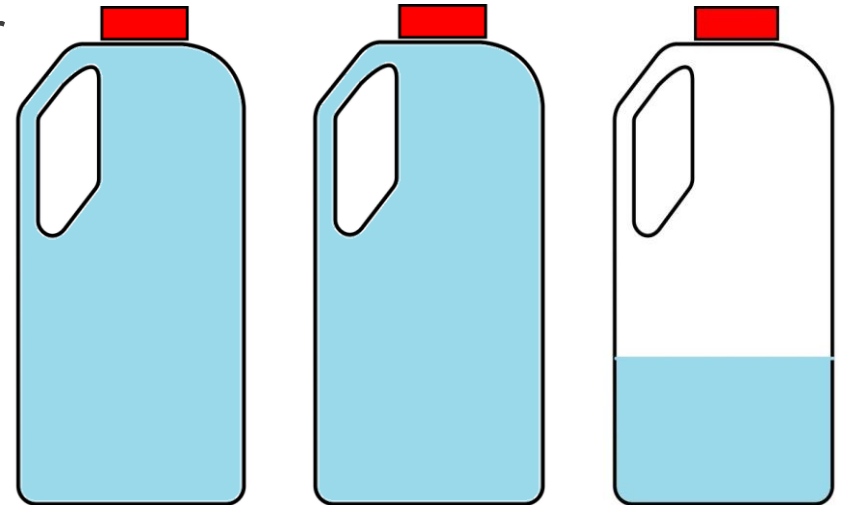
- Taitem Engineering also assessed the potential energy savings inherent in fixing bath and shower diverter leakage.
- Fixing a diverter leak that saves 0.8 gallons of water per minute could save 2,785 gallons per household per year.
 - Saves 415 kWh/year or 17 Therms/year
 - Monetary savings of \$18 to 50/year
 - Additional energy savings mean faster consumer payback rates!



Bath and Shower Diverter Background

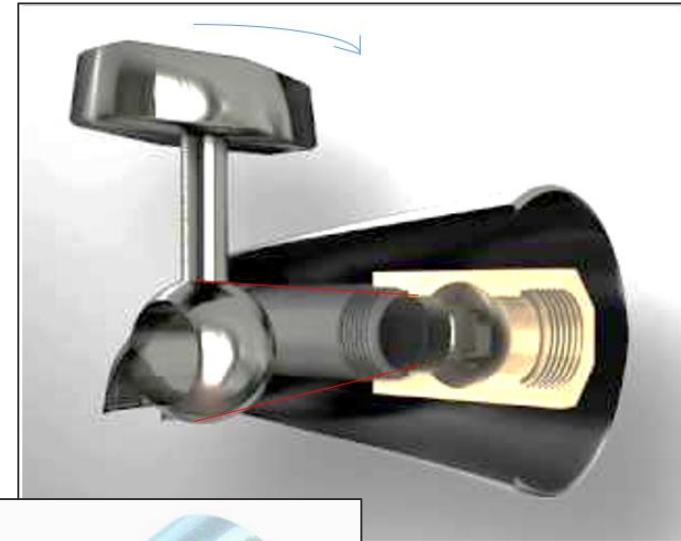
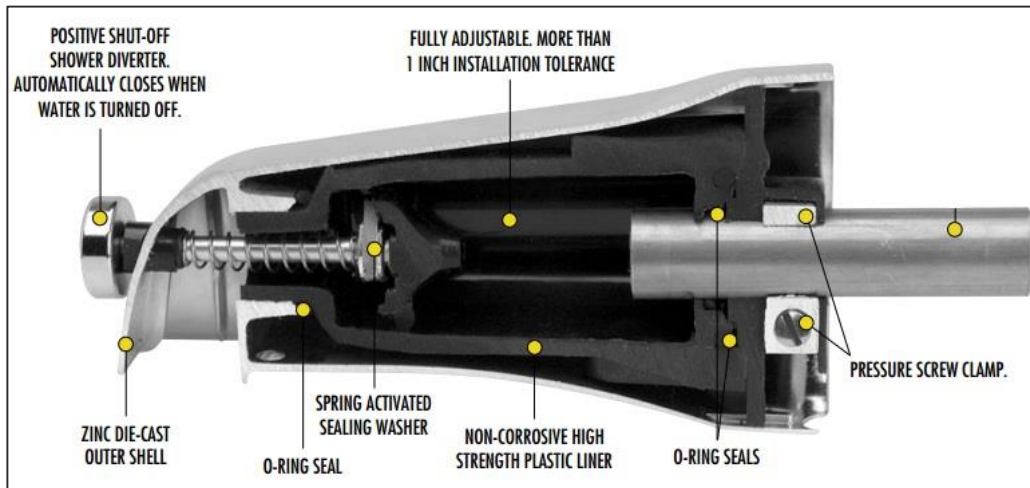
- EPA estimates there are 145 million bath and shower diverters installed in homes and another 3 million in hotels across the United States.
- Field studies show older models on average leak 0.3 gpm.
 - This will waste 2.3 gallons of water with every shower
 - wasting **1,500 gallons a year!**
 - Equals water needed for 90 showers
 - Saves nearly **190 kWh per year** with an electric hot water heater

2.3 Gallons



Bath and Shower Diverter Background

- Many models currently on the market can eliminate leaks entirely
- New, innovative designs



Bath and Shower Diverter Background Summary

WaterSense Labeled Product	Estimated Annual Household Water Savings (gal)
Pre-Rinse Spray Valves	7,000
Flushing Urinals	4,600
Showerheads	2,900
Bath and Shower Diverters	1,500
Faucet Aerators	700

Utilities serving 200,000 households that replace their old, leaky bath and shower diverters could save

300 million gallons of water and 37 MWh a year.

Bath and Shower Diverter Background Summary

- A WaterSense specification for bath and shower diverters would
 - Draw attention to old, leaky diverters that persistently waste water and energy
 - Recognize the top performing technologies on the market
 - Drive the market to offer even more options that effectively do not leak

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Part 3:

WaterSense Notice of Intent (NOI) for Bath and Shower Diverters



Scope Considerations

- WaterSense labeling criteria for bath and shower diverters will apply to:
 - Product Category: Bath and Shower Diverters
 - Product Families: Tub Spout and Tub-to-Shower Diverters
- WaterSense intends to exclude:
 - Other types of diverters (shower-to-shower, bidet, shampoo, shower-to-body spray diverters, etc.)
 - Companion products such as twin ell adaptors, vacuum breakers, or in-line flow control devices

Scope Considerations: Product Families

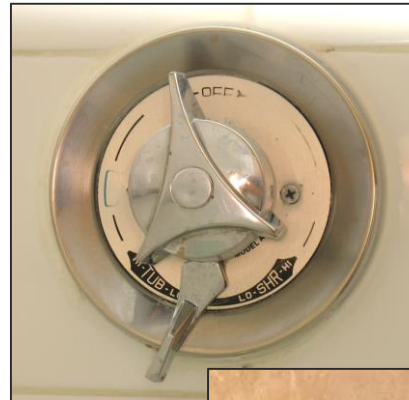
Tub Spout Diverters

diverter mechanism is embedded in the tub spout fitting



Tub-to-Shower Diverters

diverter mechanism is embedded as a valve in plumbing .



Proposed Criteria: Product Life Cycle

- WaterSense is considering setting leak rate limits that apply to the entirety of a bath and shower diverter's life cycle by establishing:
 - a pre-life cycle leak rate limit and
 - a post-life cycle leak rate limit
- WaterSense is considering adopting 15,000 cycles for a bath and shower diverter life cycle, same as the ASME/CSA standard.
- 15,000 cycles = +22 years of use in a typical home

Proposed Criteria: Leak Rate

- WaterSense is considering setting “0-0” limits for bath and shower diverters.

Standard	Pre-Life Cycle Leak Rate (gpm)	Post-Life Cycle Leak Rate (gpm)
National: ASME/CSA	0.1	0.2
State: CEC	0.01	0.05
WaterSense	0	0

Products in CEC database

Diverter	Total Models in Database	No. Models With “0-0” Test Results	% Models With “0-0” Test Results
Lift-Type	1907	535	28%
Pull-Type	183	69	38%
Push-Type	149	53	36%
Turn-Type	658	596	91%
Total	2,897	1,253	43%

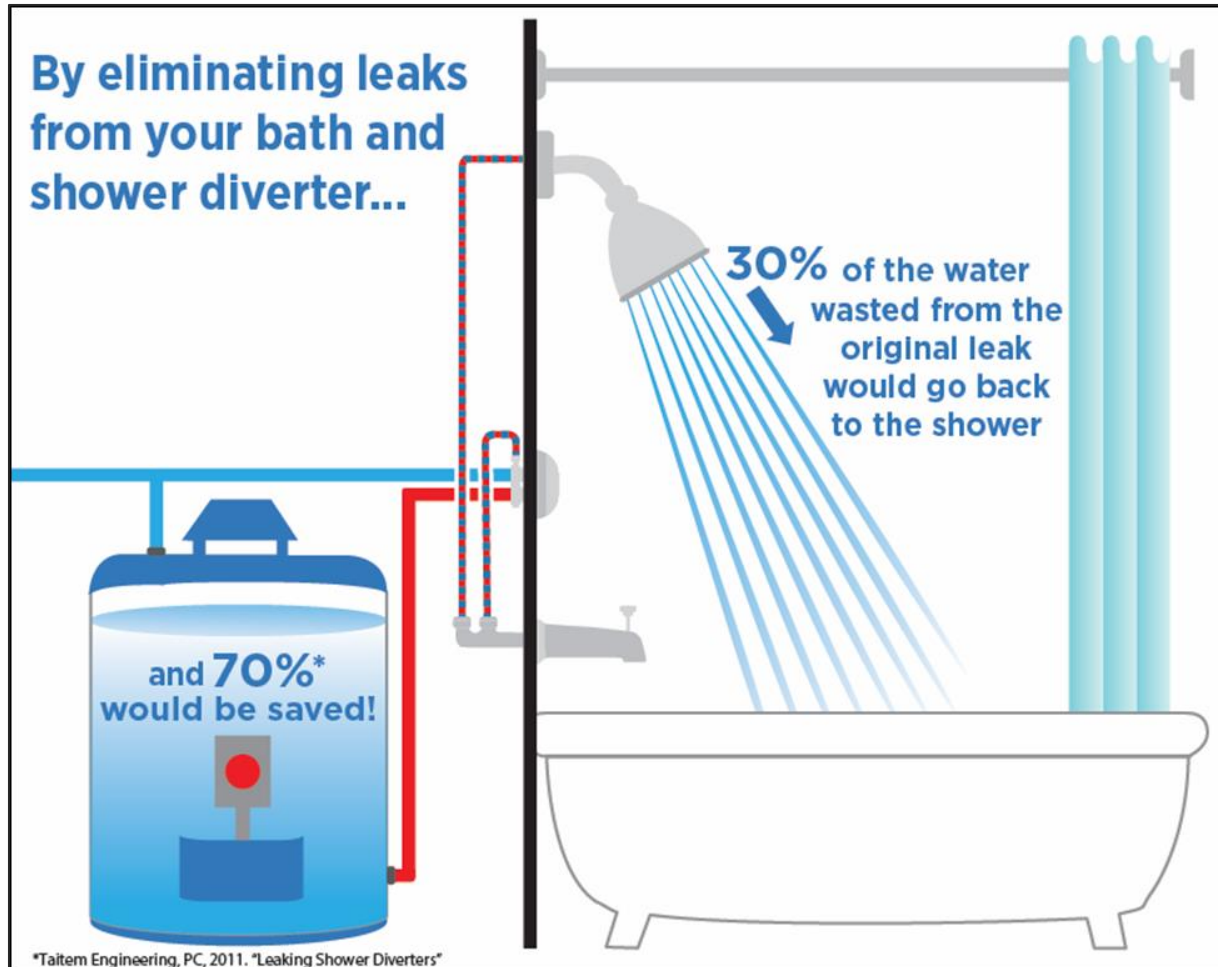
- WaterSense aims to drive the market to offer even more options that effectively do not leak.

Source: MAEDBS: Appliance Efficiency Database (AED). California Energy Commission, 2017.

Leak Rate Criteria: Savings Factor

- When a diverter leak is fixed, some of the water is diverted to the showerhead and used in the shower event.
- Taitem Engineering's study quantifies the fraction of water not diverted back to the shower as the savings factor.
- Based on this study, the actual household savings from replacing leaking diverters would be reduced.
- The savings factor can be impacted by:
 - system water pressure
 - magnitude of the initial leak
 - showerhead selection

Leak Rate Criteria: Savings Factor



Product and Performance Testing

- Bath and shower diverters must conform to applicable requirements within the ASME/CSA standard.
- Bath and shower diverters shall be tested for leakage:
 - At 10 psi flowing pressure
 - Measured between the diverter and the secondary outlet at 12 inches from the diverter
 - With water at $100 \pm 10^{\circ}\text{F}$
 - Measurements shall be taken for 5 minutes, beginning 1 minute after the diverter is activated

Next Steps

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Water Sense is looking for more information and supporting material for further consideration on:

- What constitutes “zero leakage”?
- How much leak tolerance is required, if any, to encompass automatic reset diverters?
- Additional information to determine if a savings factor is appropriate, and if so, a value for a savings factor.
- Other factors that can cause a bath and shower diverter to leak.
- Best ways to engage the plumbing community in this specification design process.



Next Steps



- NOI can be reviewed at:
 - www.epa.gov/watersense/products/bath_and_shower_diverters.html
- Submit written comments to:
watersense-products@erg.com
- Draft specification anticipated in Spring/Summer 2017



Contact Us



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