

Leaks in Water-Using Fixtures

Last Updated: 06/29/2017

Scope



Properly install all water-using fixtures, equipment, and appliances such that there are no leaks.

There shall be no detected leaks from the hot water delivery system, toilets/urinals, sink faucets, showerheads, or from other fixtures or appliances.

Compliance shall be verified through pressure-loss testing on all water supplies and visual inspection.

See the [Compliance Tab](#) for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.

Description

An American home can waste, on average, more than 10,000 gallons of water every year due to running toilets, dripping faucets, and other household leaks.

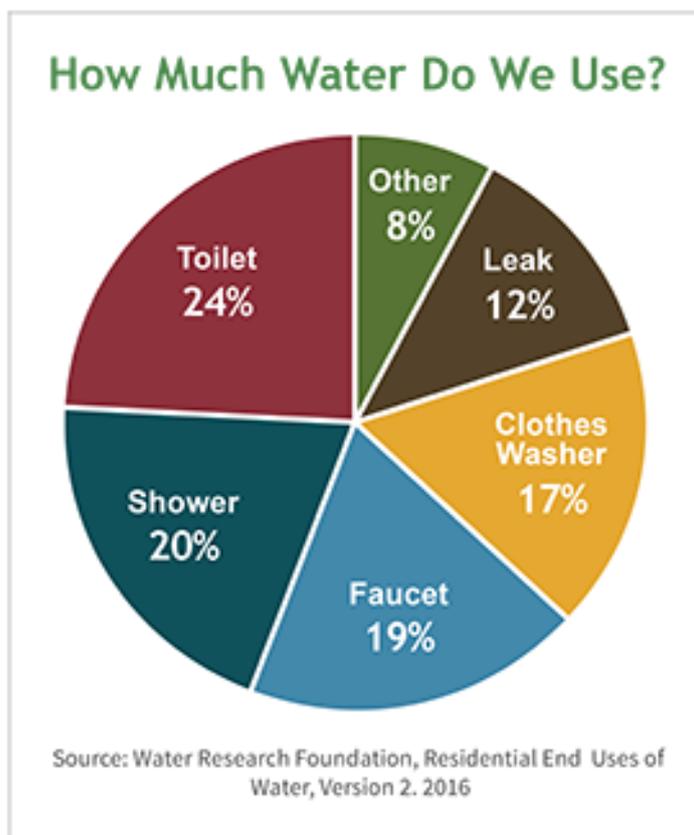


Figure 1. Residential Water Use (Source: [U.S. EPA WaterSense](#)).

Likely sources of leaks include:

- Pipes and fittings running between the utility's water main and the foundation of the home.
- All connection points in the hot water delivery system.
- Toilet angle valves and connections.
- Toilet flapper valves.
- Hot/cold water connection hoses and valves at kitchen and bathroom faucets.
- Shower arm and showerhead threaded connections.
- Shower diverter in bath/shower combinations.
- Connections and valves to dishwashers, clothes washers, refrigerator ice machines, evaporative air conditioners, water softeners, and drinking water treatment systems, if installed.

Although not required as part of a WaterSense® labeled new home, many devices and systems exist to detect leaks in residential plumbing systems at predetermined locations (e.g., clothes washers, dishwashers, toilets, water heaters, sinks, and pipes that may freeze). Some devices automatically shut off the water supply to the house or to the specific appliance to reduce water loss through leaks or ruptures. Other devices may sound a loud alarm for early water leak detection. Most of these devices have components that are battery operated and therefore require homeowner maintenance to ensure performance. If operating correctly, devices that automatically shut off the water may significantly reduce the amount of water loss through leaks and ruptures. They may also serve as a selling feature of the house due to their potential to reduce or prevent property damage caused by flooding.

Installing water meters at each single-family home, if not provided by the municipality, is another way for homeowners to check for leaks. Water meters can indicate that a leak exists if flow is detected when all water fixtures are turned off. Residents could also benefit from the installation of a water meter by obtaining a more accurate account of water use for utility billing purposes.



Figure 2. Plumbing leaks can occur in faucet fittings
(Source: [U.S. EPA WaterSense](#)).



Figure 3. Plumbing leaks can occur in showerheads
(Source: [U.S. EPA WaterSense](#)).



Figure 4. Plumbing leaks can occur in pipe connections
(Source: [U.S. EPA WaterSense](#)).



Figure 5. Plumbing leaks can occur in bathtub faucets
(Source: [U.S. EPA WaterSense](#)).



Figure 6. Plumbing leaks can occur in dishwasher connections
(Source: [U.S. EPA WaterSense](#)).

Ensuring Success

To determine if there are any leaks in the home, inspectors will conduct a pressure-loss test.

Pressure-loss testing in Single Family Homes:

- For homes with only one water supply to the home, the inspector will attach a pressure gauge to an outside faucet, take a reading, and then shut off the municipal water supply to the house. After several minutes, the inspector will determine if the pressure has dropped. A loss of pressure indicates an unseen leak.
- For homes with more than one water supply or without an outdoor faucet, inspectors will attach a pressure gauge to the cold water faucet for the washing machine hookup or other cold water faucet and take the pressure reading.
- For homes with a separate water supply for irrigation (e.g., reclaimed water), the inspector will check both the outdoor and indoor water supplies for leaks using the approach described above.

All leaks must be fixed before a home can be certified and receive the WaterSense® label certificate.

Conducting a pressure-loss test on homes in multi-family buildings will vary based on the plumbing system design. Homes that are supplied through a single line with a shut-off can be tested at any point of use within the home. If the home is supplied by multiple supply lines, the inspector will need to coordinate with the builder to ensure that all individual supply systems are tested.

During the inspection, the inspector will check for leaks at all visible water supply connections and valves for water-using fixtures, appliances, and equipment. To check for toilet leaks from the flapper valve, the inspector will remove the tank lid and add some food coloring or a dye tablet to the tank. After about 5 minutes, if the water in the toilet bowl is colored, the flapper valve is leaking. Flush immediately upon completing the experiment and check to make sure the tank and bowl are both clear of the coloring to avoid any staining.

If possible, the builder can fix any identified leaks while the inspector is still at the home, and those areas can be immediately re-inspected. Some leaks, such as those from irrigation systems, may be more difficult to immediately fix and may require re-inspection at a later date.

Climate

No climate specific information applies.

Training

Right and Wrong Images

None Available

CAD

None Available

Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

[Environmental Protection Agency \(EPA\) WaterSense® New Home Specification](#)

The EPA WaterSense New Home Specification states that:

There shall be no detected leaks from any water-using fixtures, appliances, or equipment. Compliance shall be verified through pressure-loss testing and visual inspection.

More Info.

Access to some references may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](#) if you find broken links.

Case Studies

None Available

References and Resources*

1. [Inspection and Verification Guidance for WaterSense® Labeled New Homes](#)

Author(s): U.S. Environmental Protection Agency

Organization(s): EPA

Publication Date: July, 2014

Resource that provides WaterSense inspectors with guidance for verification of program requirements for water-efficient new homes under the U.S. Environmental Protection Agency's (EPA's) WaterSense program.

2. [Resource Manual for Building WaterSense Labeled New Homes](#)

Author(s): U.S. Environmental Protection Agency

Organization(s): EPA

Publication Date: July, 2014

Resource to help builders better understand the WaterSense requirements for labeled homes and assist them in meeting the criteria so they can receive the label for their new construction.

3. [WaterSense Labeled New Home Inspection Checklist](#)

Author(s): U.S. Environmental Protection Agency

Organization(s): EPA

Publication Date: July, 2014

Resource that provides a checklist of program criteria for water-efficient new homes under the U.S. Environmental Protection Agency's (EPA's) WaterSense program.

4. [WaterSense New Home Specification](#)

Author(s): U.S. Environmental Protection Agency

Organization(s): EPA

Publication Date: July, 2014

Resource that establishes the criteria for water-efficient new homes under the U.S. Environmental Protection Agency's (EPA's) WaterSense program.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide

The following authors and organizations contributed to the content in this Guide.

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