**Inspection and Verification Guidance for HERSH2O**

# Version 1.1

**June 19, 2018**

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# Inspection and Verification Guidance for HERSH2O

1. **Background**

The Residential Energy Services Network (RESNET) began developing guidelines for a home water efficiency rating standard in 2015. After two years of development, a public comment period and input from the country’s leading water efficiency experts, RESNET finalized the HERSH2O Index. HERSH2O is a first-of-its-kind whole house system to rate the water efficiency of a home.

*HERSH2O* has two topic areas:

* 1. Indoor water use, including plumbing, plumbing fixtures and fittings, appliances, and other water-using equipment.
  2. Outdoor water use, including landscape design and irrigation systems.

HERSH2O was built on Addendum A-Domestic Hot Water Systems of ANSI/RESNET/ICC Standard 301-2014 and allows builders to provide a rating of the water efficiency of a home in the same way that HERS does for energy efficiency.

# General Site and Inspection Information

The Rater should begin each inspection by confirming the address of the house or building on the *HERSH2O Inspection Checklist* and taking a digital photo of the front of the home (or building) being inspected that includes the landscape. Fill in the inspection date and start time on the inspection checklist. At the end of the inspection, the Rater should fill in the time completed and sign the inspection checklist. The Rater should provide the builder with a copy of the inspection checklist and submit the completed, signed inspection checklist, required documentation, and digital photograph to his or her provider.

Homes eligible to earn the *HERSH2O* label include:

* Single-family homes, and
* Townhomes

Every home submitted to the Provider by the Rater for certification must be inspected, unless the provider offers sampling. RESNET Quality Assurance Providers may offer a sampling protocol to builders who intend to certify multiple homes within the same subdivision or planned community. All sampling shall be in accordance with Chapter 6 of the Mortgage Industry National Home Energy Rating Standards (MINHERS).

The builder is expected to make the documentation listed in this guidance available to the Rater. This is typically done onsite during the inspection, but it can also be arranged for at any mutually agreeable time.

The builder is required to keep all the documentation that will be needed as part of the inspection process. The Rater is required to keep a copy of the inspection checklist, the digital photo, and any other supporting information that was obtained during the inspection.

If there are issues associated with compliance with the specification, the Rater should notify the builder and allow for the issue(s) to be corrected. The home can be re-inspected at the builder’s expense. Any nonconformities should be noted on the inspection checklist along with the corrective actions that were taken.

# Required Equipment

To conduct the inspection, Raters will need the following pieces of equipment:

* Watch with second hand or stop watch
* Digital thermometer such as a digital food thermometer
* Pressure gauge
* Bucket or flow bag with volume measures marked
* Dye tablets for toilets
* Flashlight
* Digital camera
* Tape measure

# Indoor Water Efficiency Criteria

Raters should conduct the inspection of the indoor water efficiency criteria in the following order. Fill out the *HERSH2O Inspection Checklist* (or other, similar method of documentation) and gather supporting documentation, as appropriate.

Each unit for which the builder is seeking the *HERSH2O* label shall be individually inspected to verify that it meets the indoor water efficiency criteria.

## Leaks

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.

Rater Instructions

* Make sure that the water is turned on to the house or multi-family building and individual units, as appropriate. Attach a pressure gauge to the cold water faucet for the washing machine hookup or other cold water faucet and take a pressure reading. Turn the water to the home or unit off and wait approximately 10 minutes, then take another pressure gauge reading. A loss of pressure indicates a leak. Notify the builder if a leak is detected.
* For homes with a separate water supply for irrigation (e.g., reclaimed water), check both the outdoor and indoor water supplies for leaks. To check the outdoor water supply, attach a pressure gauge to the outside faucet and take a pressure reading. Wait approximately 10 minutes and take another pressure gauge reading.

To check the indoor water supply, make sure that the water is turned on to the house. Attach a pressure gauge to the cold water faucet for a washing machine hookup and take a pressure reading. Turn the water to the house off. Wait approximately 10 minutes and take another pressure gauge reading. A loss of pressure in either water supply indicates a leak. Notify the builder if a leak is detected.

* During the inspection, check for leaks at all visible water supply connections and valves for water-using fixtures, appliances, and equipment. Notify the builder if leaks are detected. Some of the specific inspection requirements included below will provide additional instructions for checking for leaks.

## Service Pressure

Requirements

The static service pressure shall be a maximum of 60 pounds per square inch (psi) (414 kilopascal [kPa]). Compliance for homes supplied by groundwater wells shall be achieved by

use of a pressure tank. Compliance for homes with publicly supplied water shall be achieved by one of the following methods:

* Use of a pressure-regulating valve (PRV) downstream of the point of connection. All fixture connections shall be downstream of the PRV; **or**
* Determination that the service pressure at the home is 60 psi or less at the time of inspection *and* documentation from the public water supplier that service pressure is unlikely to regularly exceed 60 psi at the home or unit on a daily or seasonal basis.

Piping for home fire sprinkler systems is excluded from this requirement and should comply with state and local codes and regulations.

Rater Instructions

* Determine if the home receives publicly supplied water or receives water from a groundwater well.
* If the home’s water is supplied by a groundwater well, verify that a pressure tank is installed and that the pressure is set to 60 psi or below.
* If the home’s water is publicly supplied either:
  + Verify that a PRV is installed downstream of the point of connection; **or**
  + Verify that the water pressure to the home or unit is 60 psi or less (this could be done during the pressure-loss testing discussed in Section 3.1), *and* that there is written documentation from the water supplier that pressure is not expected to exceed 60 psi. Retain a copy of the documentation as part of the inspection records.
* Note that separate PRVs may have been installed for indoor and outdoor water usage.

## Hot Water Delivery System

Requirements

The pipe length for the hot water delivery system shall be determined, along with the length of any recirculation loop and recirculation branch. The watts for the recirculation pump shall also be noted as well as the presence or absence of a drain water heat recovery system and pipe insulation.

Rater Instructions

* Verify that the water heater is on. It is common for builders to turn off the gas and reduce the temperature setting to “vacation” on a gas water heater or to trip the breaker.
* Check to see that connection points in the hot water delivery system do not leak.
* Check the type of hot water delivery system installed to verify the type of recirculation system, if one is installed.
* If a recirculation system is installed, verify the watts of the pump.
* Determine the length of hot water piping from the hot water heater to the farthest hot water fixture, measured longitudinally from plans, assuming the hot water piping does not run diagonally, plus 10 feet of piping for each floor level, plus 5 feet of piping for unconditioned basements (if any). Can be determined from plans.
* Determine hot water recirculation loop piping length including both supply and return sides of the loop, measured longitudinally from plans, assuming the hot water piping does not run diagonally, plus 20 feet of piping for each floor level greater than one plus 10 feet of piping for unconditioned basements. Can be determined from plans.
* Determine the length of the branch hot water piping from the recirculation loop to the farthest hot water fixture from the recirculation loop, measured longitudinally from plans, assuming the branch hot water piping does not run diagonally. Can be determined from plans.
* Indicate the presence or absence of hot water pipe insulation and indicate the R-value, if present.
* Indicate whether or not a drain water heat recovery system is installed. If installed, note whether or not one shower, or more than one shower are connected to the system.

## Toilets

Rater Instructions

* Obtain the make and model name and number of all toilets installed in the house from the builder. Retain a copy of the documentation as part of the inspection records.
* Verify that the toilets installed match the builder’s list.
* Check the angle valve and connections for visible leaks.
* Conduct a dye tablet test in each toilet to ensure the flapper is not leaking:
  + Drop dye tablets into the toilet tank and wait five minutes (while waiting you may want to test the faucets and/or showerheads).
  + Check the toilet bowl for tablet color. If color flows into the toilet, the flapper valve is leaking and needs to be replaced.
  + Flush upon completion to avoid staining from the dye.
* Check the water level setting:
  + Remove the tank lid.
  + Flush toilet.
  + Ensure water level is properly set so that water does not overflow from the overflow tube.

## Bathroom Sink Faucets

Rater Instructions

* Obtain the make and model number of all bathroom faucets or faucet accessories installed in the house from the builder. Retain a copy of the documentation as part of the inspection records.
* Check the maximum flow rate from all faucets to ensure that the aerators have not been removed or tampered with:
  + Use a small bucket underneath or attach a flow-measuring bag to the faucet spout.
  + Turn on the water completely while starting a stopwatch. If the faucet has two handles, turn both handles on completely.
  + After 10 seconds on the stopwatch, turn off the water.
  + The volume of water collected should be approximately 0.25 gallons or 1.0 liter.
* Check the faucets for leaks after the water flow is turned off.
* Check the faucets’ hot/cold water connection hoses and valves for leaks.

## Kitchen Sink Faucets

Rater Instructions

* Check the maximum flow rate from all kitchen sink faucets:[2](#_bookmark13)
  + Use a small bucket underneath or attach a flow-measuring bag to the faucet spout.
  + Turn on the water completely while starting a stopwatch. If the faucet has two handles, turn both handles on completely.
  + After 10 seconds on the stopwatch, turn off the water.
  + The volume of water collected should be approximately 0.4 gallons or 1.5 liters.
* Check the faucet for leaks after the water flow is turned off.
* Check the faucet valves and/or connection hoses for leaks.

## Showerheads and Shower Compartments

Shower Compartment Requirements

The total flow rate of water from all showerheads flowing at any given time, including rain systems, waterfalls, bodysprays, and jets, shall be verified for each shower compartment.

Rater Instructions

* Obtain the make and model number of all showerheads installed in the house from the builder. Retain a copy of the documentation as part of the inspection records.
* Check the showerhead for leaks at the shower arm and showerhead threaded connection. Also, if it is a bath/shower combination, check the shower diverter for minimum water seepage.

1. Note: Faucets with maximum flow rates of *less than* 2.2 gpm are acceptable.
2. Note: Kitchen sink faucets include bar faucets but not pot filling faucets.
   * Check the maximum flow from the showerhead.
     + For a single showerhead in a shower compartment:
       - Use a bucket or attach a flow measuring bag to the showerhead.
       - Turn on the water completely while starting a stopwatch. If the shower has two handles, turn on both handles completely.
       - After 10 seconds on the stopwatch, turn off the water.
       - The volume of water collected should be approximately 0.35 gallons or 1.35 liters.
     + For multiple showerheads in a single shower compartment:
       - Use a bucket, attach a flow measuring bag, or use another method to capture all of the water flowing from each showerhead, either together or individually.
       - Turn on the water completely while starting a stopwatch. If the shower has two handles, turn on both handles completely.
       - After 10 seconds on the stopwatch, turn off the water.
       - Add the maximum flow rates from each showerhead to determine the total flow rate.
   * If a single device contains multiple showerheads, hand-held showers, etc., verify the maximum flow rate from each of the possible operating modes. The greatest flow rate should be used for the rating.
   * If more than one showerhead is installed in a shower, verify that the showerhead serving the additional area is operated by separate controls. If there are not separate controls, use the flow rate from all showerheads operated by a single control for the rating. Where there are separate controls, use the showerhead with the highest flow rate for the rating.

***Note: The following indoor water efficiency criteria only apply if the builder has financed, installed, or sold as an upgrade the appliance or other equipment listed below.***

## Dishwashers

Rater Instructions

* + Retain a copy of the documentation for the dishwasher water factor as part of the inspection records.
  + Check for leaks at all visible connection valves.

## Clothes Washers

Rater Instructions

* + Retain a copy of the documentation for the clothes washer water factor as part of the inspection records.
  + Check for leaks at all visible connection valves.

## Water Softeners

Requirements

Where a water softener system is installed, the Rater shall verify the water hardness of the area.

Rater Instructions

* + Verify through the manufacturer’s product specification sheet or product manual that the softener has been certified to meet NSF/ANSI 44 Residential Cation Exchange Water Softeners, including the voluntary efficiency rating standards in Section 7. Retain a copy of the documentation as part of the inspection records.
  + Check for leaks from all visible connections and valves.

## 

# Outdoor Water Efficiency Criteria

## Landscape

Requirements

All landscape criteria apply to the front yard. In addition, the criteria apply to all areas improved upon by the builder. This includes areas with vegetation beyond temporary stabilization measures, irrigation systems, permeable hardscape or softscape features, pools, spas, and/or water features. Temporary landscapes (e.g., straw over bare soil) may be installed if permanent landscapes cannot be installed due to climate conditions. Homes or buildings with temporary landscapes can be inspected for compliance with indoor criteria and may be sold or occupied before a permanent landscape is installed. The HERSH2O label may not be issued until the permanent landscape is installed, inspected, and certified to comply with the outdoor criteria.

Inspection

* Determine the portions of the landscape to which the criteria apply:
  + This includes the front yard and all other areas improved upon by the builder.
  + Areas improved upon by the builder include:
    - Areas with vegetation beyond temporary stabilization measures
    - Irrigation systems
    - Permeable hardscape or softscape features
    - Pools, spas, or other water features

## Landscape Design

Landscaped area is defined as the designed area of landscape excluding the footprint of the home and permanent hardscape areas, such as driveways, sidewalks, and patios. Septic drainage fields and public right-of-ways should also be excluded from this calculation.

Rater Instructions

* Measure or obtain documentation of the total lot area for the rated home, in square feet. This can typically be determined from a site plan.
* Measure or obtain documentation to determine the total landscaped area.
  + Measure the surface area of any pools, spas, and water features installed and include those areas in the total landscaped area.

## Pools/Spas

Requirements

Pools and spas financed, installed, or sold as upgrades by the homebuilder shall have an appropriate cover.

Rater Instructions

* Verify the number of pools and/or spas installed.

## Irrigation System Design and Installation

Verify the type of irrigation system installed and document the zone flow rates, whether or not a professional audit of the system was conducted and whether or not the system was designed using the Residential Irrigation Capacity Index (RICI).

Rater Instructions

* Determine whether or not an automatic irrigation system is installed.
* Verify whether or not the automatic irrigation system is run by a smart controller (i.e., weather-based controller).
* If the Residential Irrigation Capacity Index (RICI) was used to determine zone flow rates, ask the builder for documentation.
* Ask the builder whether or not a certified irrigation professional audited the system. If so, request the audit results and any other documentation.
* Obtain documentation from the irrigation installer or builder, indicating the number of irrigation zones and the flow rates for each zone.