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EPA WaterSense

Every drop counts.

Specifying Criteria for EPA's WaterSense® Labeled New Homes

2008 WaterSmart Innovations Conference

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Presentation Outline

- Background
- Introduction to WaterSense
- WaterSense New Homes
- Overview of Efficiency Criteria
- Summary of Comments Received
- WaterSense New Homes Pilot Program
- Next Steps

Need for Water Efficiency

Water shortages expected in 36 states

Consumers looking for ways to save on rising utility bills

High-performing technology available

Opportunity to change landscaping and plumbing practices

Water efficiency has potential for significant infrastructure savings

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What Is WaterSense?

A partnership program sponsored by the U.S. EPA

Mission

To promote the value of water and help Americans make smart decisions regarding water use and water-using products

To increase the adoption of water-efficient products and services by consumers and organizations

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WaterSense Product Evaluation Factors

WaterSense uses the following factors in determining which products to label. Products must:

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

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Schedule for Evaluating WaterSense Products & Programs

	Completed: 2006/2007	Planned: 2008 and Beyond
Irrigation	Certification for Irrigation Professionals	Moisture Sensors Drip Micro Technology Smart Controllers (NOI)
Residential Plumbing	Toilets Faucets	Showerheads (NOI) Water Softening Systems
Commercial Plumbing		Toilets Pre-rinse Spray Valves Urinals (NOI)
Other		New Homes (Draft Spec) Autoclaves Medical Vacuums

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Look for the WaterSense Label

- Toilets
  - More than 200 labeled models
  - List available online at:

  www.epa.gov/watersense/pp/het.htm
- Faucets
  - Over 250 labeled models
  - List available online at:

  www.epa.gov/watersense/pp/bathroom_faucets.htm
- Showerheads
  - Under development

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Outdoor Water Use

- WaterSense labels professional certification programs for:
  - Irrigation system auditors
  - Irrigation system designers
  - Irrigation system installation and maintenance professionals
- Certified individuals can then become WaterSense partners

Over 500 irrigation partners have joined WaterSense so far!

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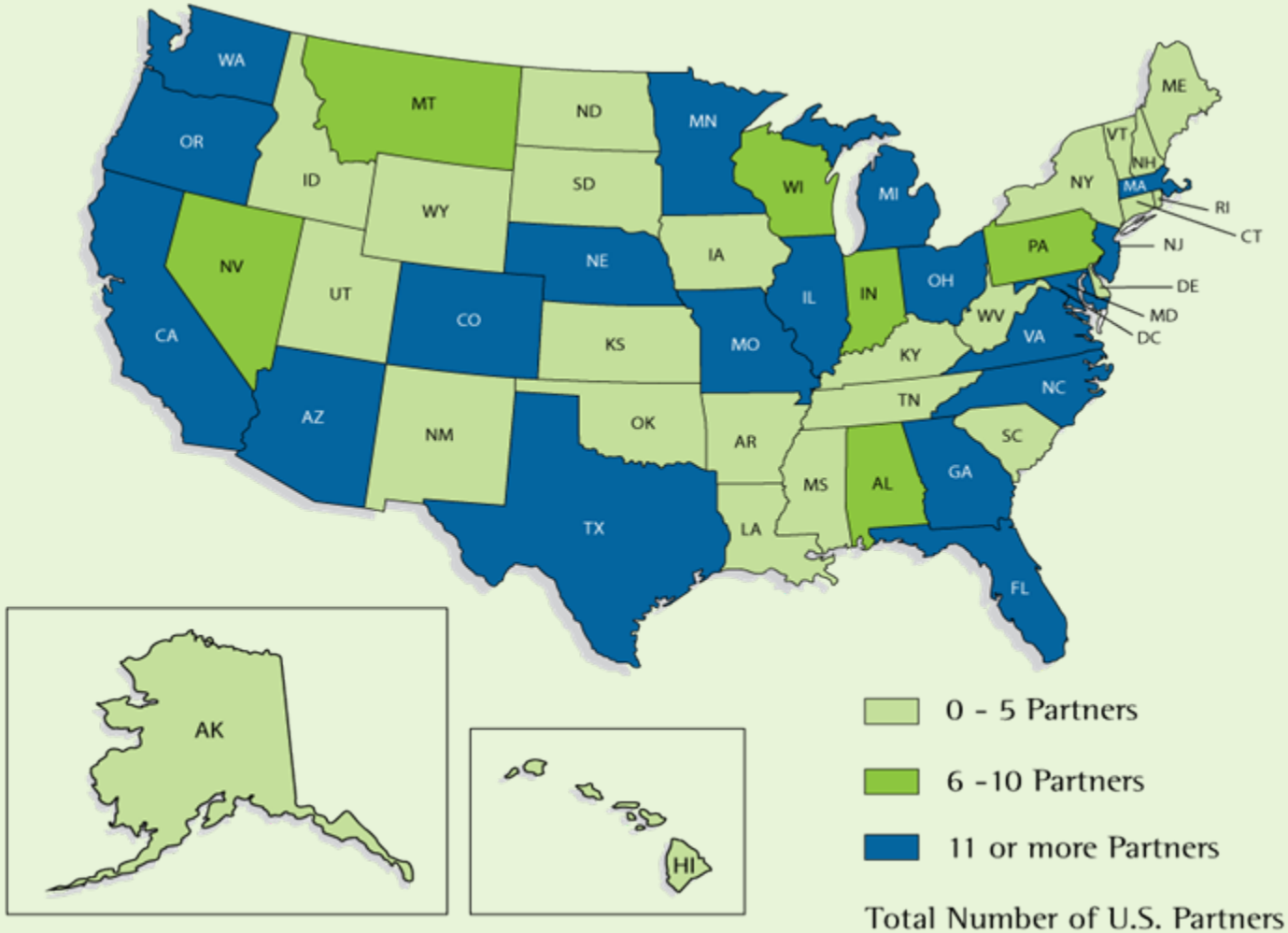
WaterSense Irrigation Partners by State (as of August 2008)



WaterSense New Homes

A New WaterSense Program

- EPA is developing a new program addressing water efficiency in new homes.
- It includes existing WaterSense criteria for products and irrigation professionals and additional criteria for other water-related products and designs.
- Builders who meet the specification can differentiate their homes as WaterSense labeled.
- EPA is developing a third-party inspection & labeling process for WaterSense labeled new homes.

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Why New Homes?

- As many as 14 million new homes needed by 2015.
- Water use in new homes may be increasing.
- Homes with highly efficient technology can save about 30% or more in water use.
- If all new homes used high efficiency technology, about 1 billion gallons of water per day could be saved by 2015.

WaterSense New Homes Program Design

- Stand-alone program under the WaterSense mark (possible nesting in other programs)
- Single-level efficiency designation
- Efficiency criteria (pass/fail)
- Third-party inspection and labeling

Key Considerations

Specifications must be:

- Simple to understand
- Objective and verifiable for inspection
- Flexible to fit building practices
- Affordable to compete with other homes
- Adaptable throughout the US
- Consistent with other environmental goals

Overview of Draft Specification

Homebuilders must meet specific water efficiency criteria in order to qualify their homes for the WaterSense label:

- **Indoor**
  - Service pressure
  - Plumbing fixtures
  - Hot water distribution
  - Appliances (if installed)
  - Other equipment (if installed)
- **Outdoor**
  - Landscape Design
  - Irrigation (if installed)
- **Homeowner Education**
  - Homeowner's manual

Draft Specification – Indoor

- Service Pressure:
  - Use of a PRV downstream of the water meter to limit static service pressure to 60 psi
  - All fixture connections must be downstream of the pressure regulator

Draft Specification – Indoor Plumbing Fixtures

WaterSense plumbing fixtures where applicable:

- **Toilets** – WaterSense labeled (1.3 gal/flush)
- **Bathroom Faucets** – WaterSense labeled (1.5/0.8 gpm)
- **Kitchen Faucets** – existing national standard (2.2 gpm @ 60 psi)
- **Showerheads** – total flow rate from all showerheads in one shower compartment (2500 in^2) is limited to the existing national standard (2.5 gpm @ 80 psi); to be revised after the release of a WaterSense final specification

Draft Specification – Hot Water Delivery System

Reduce water wasted while drawing hot water:

- Insulate all hot water pipes to a minimum of R4
- Choice of several types of delivery systems designed to reduce hot water pipe diameters and lengths
  - **Demand-initiated hot water recirculating system:** less than 0.13 gallons (0.49 liters) of water are in the piping between the recirculating loop and any hot water fixture
  - **Whole house manifold system:** less than 0.38 gallons (1.44 liters) of water are in the piping between the hot water source and any hot water fixture
  - **Core plumbing system:** less than 0.38 gallons (1.44 liters) of water between the hot water source and any hot water fixture

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Draft Specification – Indoor Appliances

Appliances – ENERGY STAR ® qualified

- If offered, financed, installed, or sold as upgrades:
  - Dishwasher – Dishwashers shall be ENERGY STAR qualified
  - Clothes washer – Clothes washers shall be ENERGY STAR qualified with a water factor ≤ 6.0

Draft Specification – Indoor Optional Items

Other Equipment – precludes use of water wasters

- If offered, the following shall meet applicable water use criteria:
  - **Evaporative coolers:** maximum of 5 gallons (18.93 liters) of water per ton-hour of cooling; blow down not to exceed 3 times in a 24-hour operating period; visible reservoir discharge outlet
  - **Water softeners:** certified to meet NSF/ANSI Standard 44; demand-initiated regeneration; capable of using potassium rather than sodium salt
  - **Drinking water treatment systems:** certified to meet applicable NSF/ANSI Standards; efficiency rate ≥ 85%

Draft Specification – Outdoor Landscape Design

- Turf area: 2 options
  - **(1) Max turf ≤ 40% of landscapable area**
  - **(2) Water budget design (based on 60% ET)**
- Slope: turf shall not be installed on slopes > 4:1
- Mulching: 2-3 inches of mulch on non-turf, non-hardscape areas
- Pools/Spas: deducted from turf allowance in Option 1 or included as landscapable area in Option 2
- Ornamental Water Features: must serve utilitarian purpose

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Draft Specification – Optional Irrigation System

- **Irrigation system, if installed, must:**
  - be designed, installed, and audited by a WaterSense irrigation partner
  - not allow flow or spray to leave property
  - meet sprinkler head and microirrigation design and placement criteria
  - have controller with prescribed capabilities (to be revised when EPA develops final specification for controllers)

Draft Specification – Homeowner Education

- **Operating Manual:**
  - Written homeowner's O&M manual for all water-using equipment and controls
  - Include information about water-efficient appliances if clothes washers or dishwashers were not provided

Qualification

- To qualify for the WaterSense label, new homes must be:
  - Built by a WaterSense Builder Partner
  - Inspected by an independent third party that meets EPA criteria for training and oversight
- Oversight will likely be conducted by Providers that participate in other national green building programs (Energy Star, LEED, NAHB)

Comment Process for Draft Specification

Spec issued for comment	May 22, ‘08
Held public meeting (webinar)	June 18
Original comment deadline	July 21
Meeting of green industry reps	Aug 14
Comment period extension	Sept 4
Post comments on website	Sept 30
Post water budget for comment	Nov
Water budget comment deadline	Dec
Post responses on website	tbd
Release final spec	tbd

Summary of Comments

- 229 commenters
- Commenters by subject
  - 1.0 Scope and objective 14
  - 3.0 Indoor criteria 43
  - 4.0 General outdoor criteria 8
  - 4.1.1 Landscape design 50
  - 4.1.4 Ornamental water features 124
  - 4.2 Irrigation design 34
  - 5.0 Homeowner education 2

Key Issues

- Hot water delivery system design
- Landscape design
  - Turf limitation
  - Front yard/whole yard
  - Water Budget Approach
- Ornamental water features
- Irrigation design

- Additional research
  - Builder landscaping practices
  - Greenhouse gas benefits of turfgrass

WaterSense New Homes Pilot Program

- Currently, 7 innovative builders across the country are building homes to meet the WaterSense draft specification criteria.
- These builders will help WaterSense test program implementation and certification processes.
- Also, their efforts will help in the preparation of program materials.
- This will allow WaterSense to roll out the New Homes program smoothly when the final specification is released.

Next Steps for New Homes

- Evaluate public comments on draft specification
- Use information gained in pilot program to:
  - Finalize program materials
  - Prepare marketing materials & partner services
- Establish inspection & certification processes
- Issue final specification
- Finalize program materials
- Launch program

More Information

- WaterSense Information
  - Web site: www.epa.gov/watersense
    - List of products
    - Partnership information
    - Test Your WaterSense Quiz
    - Fact sheets and other resources
  - E-mail: watersense@epa.gov
  - Toll-free Helpline: (866) WTR-SENS

Draft Water Efficient Single-Family New Home Specification: Water Budget Calculator

This water budget calculator can be used to determine if the designed landscape meets Criteria 4.1.1.2 of the specification.
Please refer to the Water Budget Guidance Document for additional information.

Your Name:	John Doe
Builder Name:	Acme Homes
Lot Number/Street Address:	Lot #15, 100 WaterSense Drive, Denver CO

This worksheet can be used to determine the annual Landscape Water Allowance (LWA) for a site.

The annual LWA is the annual water budget (i.e., allotment) for the site.
The following formula (based on Irrigation Association's "Landscape Irrigation Scheduling and Water Management" March 2005) is used to calculate the LWA:

$$LWA = \frac{ET_o \times K_{vs} \times A}{C_u}$$

Where:
LWA = Landscape water allowance (gallons/yr)
ET_o = Grass reference evapotranspiration (in/yr). Provided locally.
K_{vs} = Water adjustment factor (dimensionless), 0.60 (60%) for the WaterSense Specification.
A = Area of the landscape (square feet)
Cu = Conversion factor (1.62 for results in gallons/yr)

To calculate the LWA for a site, enter the area and reference evapotranspiration rate (enter data in white cells only).

STEP 1A - ENTER THE AREA (A) OF THE LANDSCAPE

10,000 Area of the landscape (square feet)

STEP 1B - ENTER THE ANNUAL GRASS REFERENCE EVAPOTRANSPIRATION (ET_o)

33.4 Annual reference ET for cool-season grass (inches/year)

Table 1. Example annual ET values for different areas of the United States

City/Region	Reference ET (in/yr)
Midwest/Great Lakes	17.0
Eugene, OR	23.7
Tampa, FL	26.0
Seattle, WA	26.4
Denver, CO	33.4
San Luis Obispo, CA	35.5
San Diego, CA	44.0
Los Angeles, CA	48.1
Riverside, CA	67.1
Phoenix, AZ	73.4

These are provided for informational purposes only.
Please refer to the Guidance Document for identifying location specific ET values.

OUTPUT - WATER ALLOTMENT FOR THE SITE

124,914 Annual Landscape Water Allowance (gallons/yr)

167.0 Annual Landscape Water Allowance for Site (hcf/year)

Draft Water Efficient Single-Family New Home Specification: Water Budget Calculator

This water budget calculator can be used to determine if the designed landscape meets Criteria 4.1.1.2 of the specification.
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Your Name:	John Doe
Builder Name:	Acme Homes
Lot Number/Street Address:	Lot #15, 100 WaterSense Drive, Denver CO

This worksheet can be used to determine the annual Landscape Water Requirement (LWR) for a site.

The annual LWR is the water requirement specific to the designed landscape. The sum of all the LWRs for each hydrozone, equals the site LWR.
The following formula (based on Irrigation Association's "Landscape Irrigation Scheduling and Water Management"-March 2005) is used to calculate the LWR:

$$LWR_H = RTM \times \left[(ET_o \times K_L) - R_e \right] \times \frac{A}{C_n}$$

Where:
LWR_H = Landscape water requirement for the hydrozone (gallons/yr)
RTM = Run time multiplier, equal to 1/irrigation efficiency
ET_o = Local reference evapotranspiration (in/yr)
K_L = Landscape coefficient for the type of plant in that hydrozone (dimensionless)
Re =Effective precipitation, 25% of annual precipitation (R) as designated by the WaterSense specification
A = Area of the hydrozone (square feet)
C_n = Conversion factor (1.62 for results in gallons/yr)

To calculate the LWR for the site, enter the information requested below (enter data in white cells only).

STEP 2A - ENTER THE ANNUAL PRECIPITATION AT THE SITE (R)

16.81 Average annual precipitation at site (inches/year)

STEP 2B - COMPLETE TABLE 1 BELOW (enter data in white cells only)

Enter the area of the hydrozone (in square feet). The total area must equal the landscape area entered in Step 1A.
Choose the plant type from the drop down list (source data is displayed in Table 2)
Choose the irrigation efficiency from the drop down list (source data is displayed in Table 3)

Table 1. Landscape Water Requirement

Zone	Hydrozone Area (sq. ft.)	Code = Plant Type	Landscape Coefficient (K_L)	Irrigation Efficiency (IE)	LWR_H (gal/yr)
1	4000	1 = Cool season grass	0.95	75%	95,502
2	1500	4 = Moderate water use plants	0.63	80%	20,869
3	3500	0 = Not Irrigated	0		-
4	1000	6 = Very low water use plants	0.27	95%	3,449
5			0		-
6			0		-
7			0		-
8			0		-
9			0		-
10			0		-
11			0		-
12			0		-
13			0		-
14			0		-
15			0		-
Total Area =	10000	Landscape Water Requirement for the Site (gal/year)			119,820

Table 2. Plant Type and Crop Coefficient

Code	Plant Type	K_L
0	Not Irrigated	0
1	Cool season grass	0.95
2	Warm season grass	0.65
3	Combined grass	0.75
4	Moderate water use plants	0.63
5	Low water use plants	0.45
6	Very low water use plants	0.27
7	(custom)	
8	(custom)	
9	(custom)	
10	(custom)	
11	(custom)	

Table 3. Irrigation Efficiency

Sprinkler Type	Efficiency
Micro spray	80%
Drip - Standard	80%
Drip - Press. Comp.	95%
Fixed Spray	75%
Rotor	80%

Source: Landscape Irrigation Scheduling and Water Management, IA March 2005

OUTPUT - WATER REQUIREMENT FOR THE SITE

118,820 Annual Landscape Water Requirement (gallons/yr)

Draft Water Efficient Single-Family New Home Specification: Water Budget Calculator

This water budget calculator can be used to determine if the designed landscape meets Criteria 4.1.1.2 of the specification.
Please refer to the Water Budget Guidance Document for additional information.

Your Name:	John Doe
Builder Name:	Acme Homes
Lot Number/Street Address:	Lot #15, 100 WaterSense Drive, Denver CO

This worksheet can be used to determine if the designed landscape meets the water budget.

If the Landscape Water Requirement is LESS than the Landscape Water Allowance, then the water budget criterion is met.

If Landscape Water Requirement is GREATER than the Landscape Water Allowance, then the landscape and/or irrigation system needs to be redesigned to use less water.

If LWR < LWA, then the water budget is met.

If LWR> LWA, then budget is not met and adjustments need to be made.

Where:
LWA = Landscape Water Allowance for the site (gallons/yr)
LWR = Landscape Water Requirement for the site (gallons/yr)

STEP 3A - ENTER THE TOTAL AREA OF TURFGRASS IN THE DESIGNED LANDSCAPE FROM STEP 2B

4000 **Area of turfgrass in designed landscape (square feet)**

STEP 3B - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2

LWA 124,914 (gallons/yr) **LWR** 119,820 (gallons/yr)

OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?

YES If YES, then the water budget criterion is met.

If NO, landscape and/or irrigation system adjustments need to be made and reflected in Step 2B - LWR.

The designed landscape is 40% **turf**

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Every drop counts.