



Draft Weather-Based Irrigation Controller Specification

Public Meeting
December 2009



Meeting Agenda

- Introduction to WaterSense®
- Weather-Based Irrigation Controller Background and Specification Development Process
- Draft Weather-Based Irrigation Controller Specification
 - Scope
 - Water Efficiency and Performance Criteria
 - Supplementary Features
- Certification and Labeling
- Next Steps



Part 1

Introduction, Background, and Specification Development



What Is WaterSense?

**A partnership program
sponsored by the U.S. EPA**

Promotes the value of water and helps
Americans make smart decisions regarding
water use and water-using products

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



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



Weather-Based Controller Background

- Weather-based controllers have only recently become available in the residential irrigation market.
- No federal regulations or standards exist for weather-based irrigation controller performance.
- Smart Water Application Technologies™ (SWAT) was initiated in 2002 to test product performance and promote these technologies.



Weather-Based Controller Specification Development Process (NOI)

- EPA issued an NOI (April 2007) identifying its intent to develop a specification for weather-based irrigation controllers
- Indicated to stakeholders an interest in using the SWAT's Climatologically Based Controller Protocol as the foundation for its specification
 - Performance criteria based on irrigation adequacy and irrigation excess
- Described potential supplementary features that a WaterSense labeled weather-based controller should have



Weather-Based Controller Specification Development Process (working groups)

- EPA established four working groups (2007) of stakeholders to address questions raised at the NOI public meeting:
 - Performance Measures - tasked with identifying performance levels based on the SWAT protocol (Draft 7), but identified some technical issues with that version of the protocol that needed to be resolved.
 - Simulated Weather - examined the feasibility of using a weather chamber for product testing, but found this to be too complex and expensive for the purposes of this program.
 - Multiple Zone Testing: discussed the potential requirement for testing controllers in more than one climate (i.e., dry vs. wet climate) and recommended that multiple testing facilities in differing climate zones be available for testing, but products should only be required to be tested at one facility.
 - User Interface: developed a list of supplementary features a WaterSense labeled controller should contain (list is included in the draft specification).



Additional SWAT Protocol Testing

- In 2008 SWAT repeated tests of a signal-based controller previously tested in California using a weather signal from New Jersey and then Florida.
 - Test results from the three locations were not significantly different.
- WaterSense conducted additional research at the University of Florida using five weather-based controllers representing three different manufacturer models (two signal-based and one sensor-based).
 - Evaluated climate impacts on test results and the reproducibility of applying the test protocol at a testing laboratory different than the Center for Irrigation Technology (CIT) laboratory located in Fresno, California
 - Indicated the protocol results were both transferable among climate regions and repeatable between laboratories



Additional SWAT Protocol Testing

- University of Florida: Results
 - Controllers generally scored well with only slightly lower scores than published from the original SWAT test, mainly on scheduling efficiency.
 - To ensure repeatability of results between laboratories, the protocol instructions required additional detail.
 - During testing some controllers scheduled irrigation events with unrealistically short runtimes - in some cases, less than 2 minutes.
 - WaterSense is addressing minimum runtimes in the draft specification



Weather-Based Controller Specification Development Process

- **Soil Moisture Sensors:**
 - Not included in the draft specification at this time because there is not an accepted test protocol for such products.
 - SWAT is currently developing a test protocol for soil moisture sensors, and EPA will evaluate their inclusion in the program when that protocol is available.



Weather-Based Controller Specification Development Process

- Questions/Discussion?



Part 2

Draft Specification for Weather- Based Irrigation Controllers



Scope and Objective

- Specification establishes criteria for weather-based irrigation controllers that utilize current climatological data and some form of evapotranspiration (ET) data as a basis for scheduling irrigation.
- Applies to:
 - Standalone controllers
 - Add-on controllers
- Does not apply to:
 - Soil Moisture Sensors
 - Heavy Commercial Products (greater than 16 stations)



Scope and Objective

- Specification applies to controllers that calculate real-time crop evapotranspiration (ET_c) based on reference evapotranspiration (ET_o) by:
 - Using on-site sensor(s) to calculate ET_o;
 - Using on-site sensor(s) to modify historical ET_o;
 - Receiving weather data from a real-time remote source to calculate ET_o; or
 - Receiving direct ET_o data from a remote source.



Water-Efficiency and Performance Criteria

- The product must be tested in accordance with the Smart Water Application Technologies™ test protocol for climatologically based controllers (Draft 8, September 2008) with the additional minimum runtime requirement:
 - Minimum Runtimes – All runtimes (irrigation cycles) that occur during the test period must be greater than three minutes in duration.
- Irrigation adequacy, as defined in the SWAT protocol, shall be greater than or equal to 80 percent.
- Irrigation excess, as defined in the SWAT protocol, shall be less than or equal to 5 percent.



Supplementary Features

- The controller shall meet the following supplementary feature requirements:
 - Non-Volatile Memory: to ensure that information regarding the irrigation program and settings is retained when the power source is lost and no back-up battery is available
 - High Performing Irrigation Controller: to ensure a controller remains a high-performing conservation controller if the product loses real-time weather input or a weather signal (e.g., multiple programming capabilities, multiple start times, percent adjust feature, and variable scheduling)
 - Zone-by-Zone Control: to successfully manage landscapes that have multiple areas with various watering requirements that need to be managed separately



Supplementary Features (cont.)

- The controller shall meet the following supplementary feature requirements:
 - Ability to Comply with Potential Utility Drought Restrictions (when operating in ET mode): to ensure that weather-based controllers are capable of watering efficiently, while complying with these restrictions
 - Capability to Interface with a Rain Device: to ensure that weather-based controllers are capable of interacting with a rain shutoff device



Draft Specification for Weather-Based Controllers

- Questions/Discussion?



Part 3

Certification & Labeling, Additional Considerations, and Next Steps



Product Certification and Labeling

- WaterSense product certification process is independent of ongoing SWAT testing conducted at the Center for Irrigation Technology (CIT) in Fresno, California.
- WaterSense held a webinar in 2008 to describe the certification system to weather-based controller manufacturers and has taken steps to introduce these manufacturers to WaterSense LCBs.
- WaterSense is working with LCBs to provide controller testing by summer 2010.



Product Certification and Labeling

- Manufacturers must sign a partnership agreement with EPA in order to have their products labeled
- All products must be certified by an EPA licensed certifying body (LCB)
 - Approved list of LCBs will be posted on WaterSense Web site with the release of the final specification
- Manufacturers apply to an LCB of choice
- LCB certifies product in accordance with WaterSense specification
- LCB authorizes manufacturer to use WaterSense label
 - Provides manufacturer with graphic artwork of label
- LCB conducts periodic surveillance
 - Factory visits
 - Product retesting
 - Label policing



Product Certification and Labeling

- Manufacturers are currently permitted to set up their products for SWAT testing at CIT; however, under the WaterSense product certification system, the LCB will be responsible for product set-up based on instruction from the manufacturer.
- Add-on controllers (i.e., those that connect through a common wire) shall be tested with at least one standard irrigation controller chosen by the LCB.
- Plug-in devices (i.e., a device manufactured for a specific irrigation controller or brand of controllers) shall be tested, labeled, and sold with the appropriate base controller.



Additional Considerations

- Other factors, in addition to product performance, impact water savings:
 - The weather-based irrigation controller is part of the irrigation system and can only perform as intended if the system is properly designed, installed, and maintained.
 - The weather-based irrigation controller must be installed and programmed properly.
 - If the weather-based irrigation controller requires a signal, it must maintain contact with its weather data source to properly schedule irrigation.

- WaterSense plans to address these issues with a two-pronged approach using marketing and outreach, as well as our national network of irrigation partners.



Additional Considerations

- Other factors impact product water savings:
 - Previous water habits: deficit irrigation
 - If a weather-based controller is installed and programmed to water at 100 percent of ETo, the water use in that landscape may increase as a result of the controller (demonstrated in Aquacraft 2009 study)
- Irrigation professionals with experience in these technologies will be able to address this issue in the field.
- These considerations are important to utilities planning rebate or giveaway programs - target high water users first to achieve the greatest savings.



Questions?

- Questions/discussion on certification and labeling?
- Questions/discussion on additional considerations?
- Other questions, comments, or concerns?



Next Steps

- Submit written comments to watersense-products@erg.com by January 18
- EPA will make public the comments received during the comment period
- Final specification issued after evaluation of public comments
- Anticipated effective date: Fall 2010



More Information



Web site: www.epa.gov/watersense

E-mail: watersense@epa.gov

Helpline: (866) WTR-SENS (987-7367)