

Summary of Revisions to the WaterSense® Specification for Weather-Based Irrigation Controllers

The U.S. Environmental Protection Agency (EPA) is announcing the release of Version 1.1 of its *WaterSense Specification for Weather-Based Irrigation Controllers*. The purpose of this document is to summarize the revisions made to the specification and share the reasoning behind the changes.

EPA considers the updates referenced in this document to be minor in nature. The updates are meant to provide clarification of the existing requirements and do not materially affect the performance or efficiency requirements for controllers. Specifically, EPA incorporated, by reference, the performance test method included in the American National Standards Institute (ANSI)/American Society of Agricultural and Biological Engineers (ASABE) Standard S627 *Weather-Based Landscape Irrigation Control Systems-2020*, as this standard adopted the test method included in Version 1.0 of the *WaterSense Specification for Weather-Based Irrigation Controllers*. Additionally, WaterSense incorporated clarifications issued on the specification since it was published in 2011 and updated the language to ensure consistency with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*, which was published in February 2021.

These changes do not affect the specification's original requirements or intent. Therefore, this minor revision does not affect the certification status of any existing WaterSense labeled weather-based irrigation controllers. These revisions simplify and clarify the *WaterSense Specification for Weather-Based Irrigation Controllers* and ensure that controllers receiving the WaterSense label are certified, marked, and labeled consistently, in accordance with EPA's intent, and will continue to meet consumer expectations for efficiency and performance. A redline strikeout version of the specification is located on the [WaterSense website](#).

I. Background

EPA released its initial *WaterSense Specification for Weather-Based Irrigation Controllers* in November 2011. Since then, EPA has issued 16 clarifications addressing requirements related to the specification scope, testing configuration, and marking requirements, among others.¹

In addition, EPA worked with the ASABE S627 committee in recent years to incorporate the WaterSense test method for weather-based irrigation controllers into its standard. This cooperative relationship engaged experts from the manufacturing, utility, and certification communities and worked through an existing public process established in the United States for developing standards and specifications for irrigation products. EPA sees this specification revision as the final phase of that harmonization effort. Within the updated WaterSense specification for weather-based irrigation controllers, EPA directly references ANSI/ASABE S627, where feasible, to align the testing and certification processes.

Additionally, since the specification for weather-based irrigation controllers was initially published, EPA subsequently published the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*, which included many of the same criteria included in the *Specification for*

¹ See EPA's *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. <https://www.epa.gov/watersense/product-specifications#Clarifications%20to%20Specifications%20and%20Certification%20System>.

Weather-Based Irrigation Controllers. Many of EPA's requirements for soil moisture-based irrigation controllers, also known as soil moisture sensors (SMSs) were meant to be consistent with the requirements for weather-based irrigation controllers. However, based on public comments received during the specification development process, WaterSense updated language in the SMS specification for clarity. Therefore, EPA made minor revisions to the *WaterSense Specification for Weather-Based Irrigation Controllers*, where appropriate, to maintain consistency with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*.

In addition, EPA has decided to postpone major revisions to its weather-based irrigation controller specification at this time based on stakeholder feedback. In 2019, EPA initiated a process to gather stakeholder feedback on specifications released before 2012, in which it held a series of webinars and a public comment period to assess the requirements and utility of its existing specifications. Both water utility and manufacturer partners urged EPA to retain the current test method, criteria, and additional requirements until weather-based irrigation controllers comprise a significant portion of the market^{2,3}.

This document summarizes the specific minor revisions made to the *WaterSense Specification for Weather-Based Irrigation Controllers* to harmonize requirements with ANSI/ASABE S627; ensure consistency with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*; and incorporate clarifications EPA has made to the specification since in 2011.

II. Summary of Specification Revisions

Section 1.0 Scope and Objective

EPA has added a reference to ANSI/ASABE S627 with respect to the types of controllers included in the scope of the specification. The original scope was based on the eighth draft of the Smart Water Application Technologies™ (SWAT) test protocol for climatologically based controllers (SWAT protocol). The SWAT protocol has been incorporated into ANSI/ASABE S627, which now serves as the industry consensus-based standard for this product category.

EPA has clarified that, in addition to rain sensors, soil moisture sensors cannot be used to meet the onsite weather sensor requirement. Soil moisture sensors do not modify historical crop evapotranspiration ET_c, but instead interrupt or modify previously scheduled irrigation based on soil moisture readings. Soil moisture sensors are separately eligible for the WaterSense label under the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*.

EPA has also clarified that the specification can apply to weather-based irrigation controllers that connect to hose bibbs.⁴ These products entered the market after EPA published the *WaterSense Specification for Weather-Based Irrigation Controllers, Version 1.0* in 2011. In 2018, EPA clarified that hose bibb controllers could earn the label as long as they met all requirements of the specification and provided additional direction regarding performance

² *Federal Register Notice*—Notice of Recent Specifications Review and Request for Information on WaterSense Program. <https://www.epa.gov/watersense/product-specification-review>.

³ WaterSense Webinar for Weather-Based Irrigation Controller Manufacturers. May 16, 2019. <https://www.epa.gov/watersense/product-specification-review>.

⁴ Based on clarification IC-0718-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

testing of these products that typically have less than the required six-zone capacity for testing. EPA has subsequently incorporated the testing clarification into Appendix A of the specification.

Lastly, for consistency with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*, EPA clarified that the scope does not apply to controllers intended for use exclusively within agricultural irrigation systems.

Section 3.0 Performance Criteria

Since the initiation of the ANSI/ASABE S627 standard development process, EPA has worked closely with the committee to evaluate, and to the extent possible, harmonize the test methods between the standard and the WaterSense specification for weather-based irrigation controllers. Test Method #1 in ANSI/ASABE S627 is identical to the test method included in Version 1.0 of the *WaterSense Specification for Weather-Based Irrigation Controllers* (see Section 3.1 and Appendix C). As such, EPA has updated the specification to reference ANSI/ASABE S627, Section 3.1.4 (Test Method #1) as the performance test method and has removed the associated SWAT protocol test modifications from the specification, as they are now incorporated into ANSI/ASABE S627. EPA has also removed Appendix C from the specification (which included the original SWAT protocol upon which the standard is now based) to eliminate redundancy between the specification and referenced standard. EPA has retained the irrigation adequacy and excess performance requirements, but now references their calculation in accordance with the standard.

Incorporating the test method from the ANSI/ASABE 627 standard ensures EPA is in compliance with the National Technology Transfer and Advancement Act (NTTAA) and the *America's Water Infrastructure Act of 2018*, which reiterated that EPA use test methods developed by consensus standard-setting bodies. The coordination with the ANSI/ASABE S627 committee and alignment of the test method with the standard also ensures validation and further industry acceptance of the WaterSense requirements and facilitates consistency of product testing in the marketplace.

The ANSI/ASABE S627 committee considered, and has also included, an alternative test method (Optional Test Method #2 Modifications) in the standard, which differs in its approach from Test Method #1. As stated in the standard, "Test method #2 is an additional test with a longer test period, different weather requirements, and modified virtual zones." EPA sought stakeholder feedback regarding the potential use of Test Method #2 during its specification review process conducted in 2019 and 2020. Utilities and manufacturers indicated support for the existing test method (upon which Test Method #1 is based) and its ability to differentiate high-performing products. The stakeholders requested that EPA retain the existing test method until more of the market consists of weather-based irrigation controllers^{5,6}. Further, EPA does not have data from Test Method #2 to evaluate how products on the market perform, and therefore has not been able to validate the efficacy of Test Method #2 in differentiating high performing and water-efficient products at this time. Therefore, the method cannot be used for WaterSense certification. Nonetheless, the alternative test method is available in the standard for use, and if manufacturers choose to test their controllers to Test Method #2 and generate a

⁵ Federal Register notice - Notice of Recent Specifications Review and Request for Information on WaterSense Program. <https://www.epa.gov/watersense/product-specification-review>.

⁶ Webinar for Weather-Based Irrigation Controller Manufacturers. May 16, 2019. <https://www.epa.gov/watersense/product-specification-review>.

set of performance data, WaterSense may review these data in the future and evaluate the test method for incorporation into any future major revision of the specification.

In addition to incorporating the ANSI/ASABE S627 test method by reference, EPA has made one minor clarification that the test period shall include the first valid 30-day period where all conditions included in Section 6 (Weather Requirements) of ANSI/ASABE S627 are met.⁷ At the end of this time period, irrigation adequacy and irrigation excess shall be compared to the criteria detailed in section 3.1 of the WaterSense specification (Version 1.1). EPA has made this change to clarify that the test period shall be no more than 30 days, despite ANSI/ASABE S627 implying the test may run longer than 30 days.

Section 4.0 Supplemental Capability Requirements

EPA made minor editorial changes to the supplemental capability requirements to ensure consistency with similar requirements included in the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*. Stakeholders suggested the edits during the public comment process for the SMS specification development to provide additional clarity.

EPA has also added the option in Section 4.4 of the supplemental capability requirements for controllers to be capable of interfacing with a rainfall device **or** soil moisture sensor.⁸ SMSs are becoming more commonly used in landscape irrigation. They can be connected to a weather-based irrigation controller instead of, or in addition to, a rainfall device. Therefore, EPA modified this requirement to allow a controller to interface with an SMS instead of, or in addition to, a rainfall device, as SMSs provide a similar mechanism of bypassing irrigation if sufficient moisture exists in the soil.

EPA also removed reference to a manual switch as a mechanism to return the controller back to the weather-based mode in Section 4.8 of the supplemental capability requirements.⁹ EPA recognizes that the market has shifted since Version 1.0 of specification was published in 2011, and many controllers no longer have any external controls or switches because they are programmed and operated via applications on smart phones or computers.

Section 5.0 Packaging and Product Documentation Requirements

EPA has combined Sections 5.2 and 5.3, which in Version 1.0 had described packaging and documentation requirements for add-on and plug-in devices separately. The criteria included in these sections are identical and, therefore, were redundant. Further, this change makes the packaging and product documentation requirements consistent with the structure in the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*.

Additionally, EPA has clarified that manufacturers may provide access to a list of compatible base controllers, instead of requiring that the list be provided in product documentation. This change is consistent with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers* and was made based on public comment. This change allows manufacturers to maintain a current, dynamic list of compatible base controllers online, which they can reference

⁷ Based on clarification IC-0617-3 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

⁸ Based on clarification IC-1220-2 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

⁹ Based on clarification IC-1220-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

in product documentation rather than printing lists in product documentation that become quickly outdated.

Section 7.0 Future Specification Revisions

EPA made minor editorial revisions for consistency with the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*.

Section 8.0 Definitions

EPA removed the reference to the SWAT protocol with respect to definitions and referenced the ANSI/ASABE S627 definitions instead.

EPA also made minor editorial revisions to several definitions for consistency with definitions included in the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*.

EPA replaced the term and definition for “smart mode” with “weather-based mode” to differentiate “weather-based” from “soil moisture-based” mode following the publication of the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*. Both products have modes that can be considered “smart.”

EPA added a definition for “soil moisture sensor,” because the term appears in Version 1.1 in Section 2 regarding scope and as an option to meet the supplemental capability requirement included in Section 4.4.

Lastly, EPA updated the definition for “reference weather station” to indicate that a licensed certifying body is not required to maintain its own weather station and can instead use offsite weather stations.¹⁰ The definition in Version 1.0 implied licensed certifying bodies should maintain their own weather station, but this is not required.

Appendix A: Testing Configuration, Programming, and Compatible Base Controller Determination

Based on information received from licensed certifying bodies that manufacturers witnessed test setup in the laboratory, EPA clarified that manufacturers shall have no interaction with the product during testing, including programming of the controller during setup or for the duration of the test.¹¹

EPA also clarified that licensed certifying bodies shall not make any special accommodations during testing for the controller to select the reference weather station as its data source. This is to ensure the tests reflect how products operate in the field with respect to weather station connection. In addition, EPA is specifying that the test report shall include the name and address of the reference weather station, which ensures transparency in test conditions and allows WaterSense to analyze data during an audit, if necessary.¹²

¹⁰ Based on clarification IC-1216-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

¹¹ Based on clarification IC-1214-3 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

¹² Based on clarification IC-1216-2 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

EPA has combined Section 2.0 and 3.0 of Appendix A, which in Version 1.0 had described requirements for add-on and plug-in devices separately. The criteria included in these sections are identical and, therefore, were redundant. Further, this change makes these requirements consistent with the structure in the *WaterSense Specification for Soil Moisture-Based Irrigation Controllers*. In addition, EPA revised the language to be clearer regarding the initial configuration for testing and determining additional compatible base controllers. After manufacturers specify a base controller for initial testing, the licensed certifying body has the discretion to identify and list additional base controllers that they determine to be compatible with the certified add-on or plug-in device. For more information, see the *Supplemental Guidance for WaterSense Certification and Labeling of Irrigation Controllers* and the *WaterSense Product Certification System*.¹³

EPA added a new Section 3.0 to Appendix A to provide guidance on how to test controllers with fewer than six stations.¹⁴ The test method for weather-based irrigation controllers requires six different landscape zones to be tested simultaneously. Most controllers have at least a six-zone capacity, but some products are solely manufactured with fewer than six (e.g., hose bibb controllers). Version 1.1 clarifies that for products that offer fewer than six stations, multiple products shall be tested simultaneously to cover the six-zone programming required by the *WaterSense Specification for Weather-Based Irrigation Controllers*. This allows for the weather data used during the test to be the same for both (or all) controllers tested.

Appendix B: Informative Annex for WaterSense Labeling

EPA has clarified Section 3.1 of Appendix B to indicate that the WaterSense label is required on product packaging for labeled weather-based irrigation controllers.¹⁵ This is consistent with the *WaterSense Program Mark Guidelines*.

EPA has combined Section 3.2 and 3.3 of Appendix B, based on the same reasoning as combining Sections 2 and 3 in Appendix A, as described above.

EPA has added a new Section 3.3 to clarify the requirements of label use with respect to base controllers determined to be compatible with add-on or plug-in devices.¹⁶ These products may bear the WaterSense promotional label and include language similar to “Look for the WaterSense labeled [plug-in or add-on device] to improve the water efficiency capabilities of this controller.” This change is consistent with the requirements in the *WaterSense Specification for Soil-Moisture Based Irrigation Controllers* and allows for promotion of the base controller without implying that they are themselves WaterSense labeled.

EPA also added a new Section 3.4 to provide guidance on certification for irrigation controllers that are both weather- and soil moisture-based. These products shall be certified to meet the requirements of both the *WaterSense Specification for Weather-Based Irrigation Controllers* and the *WaterSense Specification for Soil-Moisture Based Irrigation Controllers* for the products to

¹³ Based on clarification IC-1213-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

¹⁴ Based on clarifications IC-0113-1 and IC-0718-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

¹⁵ Based on clarification IC-1214-2 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

¹⁶ Based on clarification IC-0718-3 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.

earn the WaterSense label. This ensures that the label indicates the product has met specification criteria under both product categories.

EPA has clarified in Section 4.0 that the sampling scheme for weather-based irrigation controllers shall be in accordance with the requirements in the *WaterSense Product Certification System*¹⁷ and Section 4.1 of ANSI/ASABE S627. EPA made this change based on feedback from licensed certifying bodies indicating that the sampling requirements in Version 1.0 were not feasible because packed production products were not available in all instances, and random selection was not feasible in all cases.

III. Timeline for Compliance With Version 1.1 of the Specification

Version 1.1 of this specification is in effect as of September 2, 2021.

¹⁷ Based on clarification IC-0617-1 in the *Compendium of WaterSense Product Specification, Certification, and Labeling Clarifications*. Op. cit.