

# Accurate WeatherSet

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Subject: Suggestions for new standard for Irrigation Controllers.

Proposed name for standard: ICE rating where ICE is an acronym for Irrigation Controller Efficiency

I was glad to hear that the Energy Commission wants to establish a rating standard for irrigation controllers similar to the SER ratings for air conditioning. I was also glad to hear that the Energy Commission wants on-going testing of irrigation controllers after installation. This document addresses both of these issues.

First, the ICE rating should NOT be based on the SWAT/IA testing. Below is the published results of the SWAT/IA testing. These results show that all seven controllers performed nearly identically and an ICE rating based on this chart would give the same rating to all these controllers. The reasons for these nearly identical test results are that

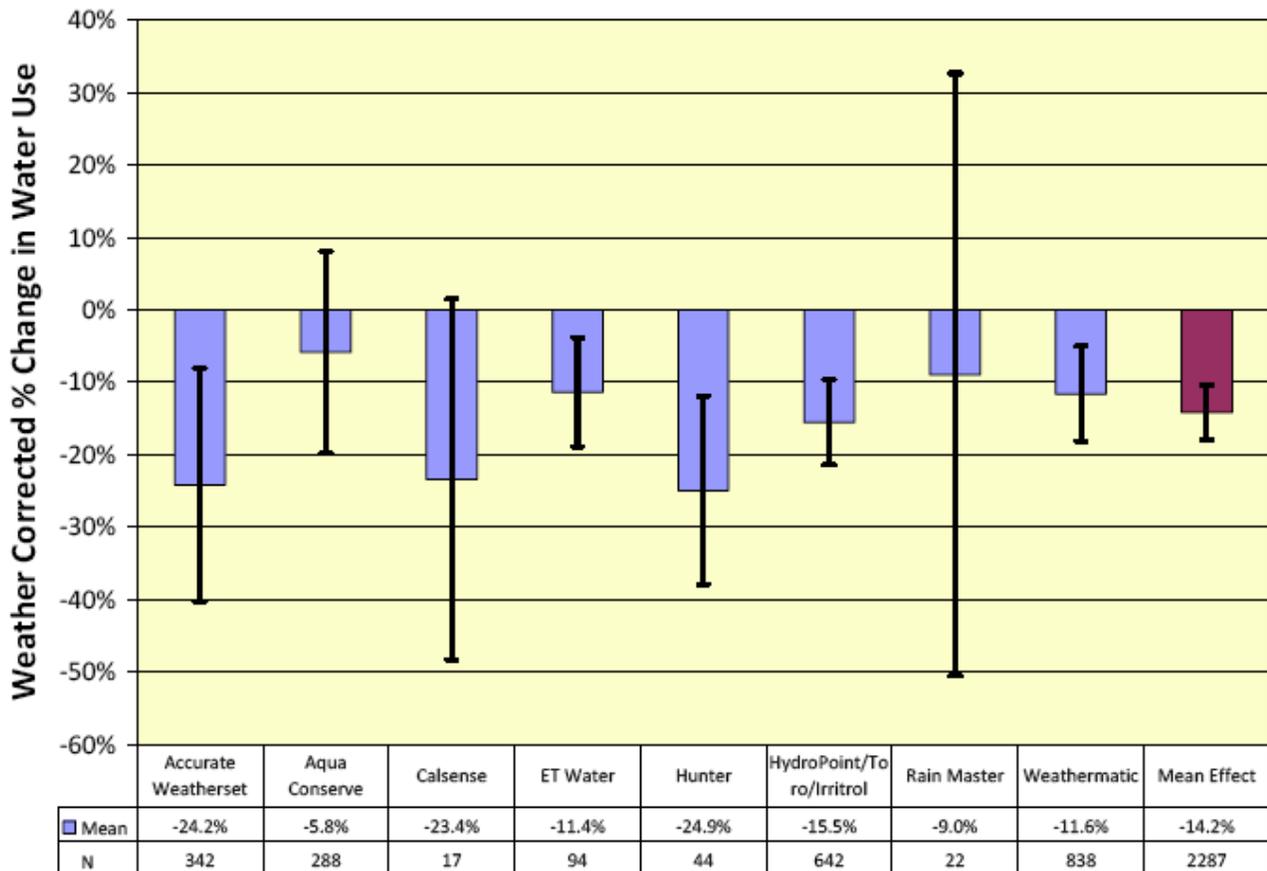
- the published test results only cover 30 days even though the controller may be tested longer
- SWAT protocol only tests one controller
- the controllers are programmed and installed by the technical staff of the manufacturer.

Product	Irr	Irr	Irr	Irr excess	Irr excess	Irr excess
	adequacy minimum 6 zones	adequacy maximum 6 zones	adequacy average of 6 zones	minimum 6 zones	maximum 6 zones	average of 6 zones
<u>Alex-tronic Enercon Plus</u>	100.0%	100.0%	100.0%	0.0%	3.6%	1.0%
<u>Alex-tronic Smart Cloc</u>	100.0%	100.0%	100.0%	0.0%	1.1%	0.2%
<u>AquConserve ET9</u>	100.0%	100.0%	100.0%	0.0%	1.3%	0.2%
<u>Calsense ET200e</u>	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%
<u>Hunter ET System</u>	100.0%	100.0%	100.0%	0.0%	2.3%	0.5%
<u>IrriTrol SmartDial</u>	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%
<u>Rainmaster RME Eagle</u>	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%
<u>Toro Intellience</u>	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%
<u>HydroPoint/WeatherTrak</u>	100.0%	110.0%	100.0%	0.0%	0.0%	0.0%
<u>Weathermatic</u>	100.0%	100.0%	100.0%	0.0%	2.3%	0.4%

The ICE rating should begin with the 315-page report of titled **EVALUATION OF CALIFORNIA WEATHER-BASED “SMART” IRRIGATION CONTROLLER PROGRAMS**. This report covers the operation of thousands of controllers installed with Proposition 13 funds to evaluate performance on irrigation controllers in the field.

The results of this field testing are shown in the chart below. This testing eliminates the five defects of the SWAT/IA testing.

- the 315 page report covers more than one year and is not limited to 30 days
- the 315-page report covers thousands of controllers, not one from each manufacturer
- the controllers are installed and programmed by homeowners and contractors, not the technical staff of the manufacturer, and monitored/verified by water districts
- the 315-page report shows wide variance of irrigation efficiency among the controllers that will provide the basis for an ICE rating system for irrigation controllers
- the report is on-going, will cover 5 year of operation and will reveal consumer resistance to paying on-going monthly signal fees for HydroPoint/Toro/Irritrol controllers



**Figure ES.1: Weather-normalized % change in water use by controller manufacturer/brand with 95% confidence error bars**

To quickly develop an ICE rating for irrigation controllers using the above chart, the chart should be used as follows:

- Give a Zero rating to all those controllers with a variance above 0%, as indicated by the black vertical lines on the chart, because that variance is too large to have confidence in the calculated average.
- Take the other averages and divide by a water savings of 25% and multiply that result by 100 to get the ICE rating for the remaining controllers. Please note that this calculation allows for an ICE rating above 100.

A table of an ICE rating system is shown below.

Manufacturer/Model	% water savings from chart	ICE rating
Accurate WeatherSet	24.2	96
AquaConserve	variance too large	0
Calsense	variance too large	0
ET Water	11.3	45
Hunter	24.9	99
Hydropoint/Toro/Irritrol	11.5	46
Rain Master	variance too large	0
Weathermatic	11.6	46

Since two of the manufacturers scored well above 90 in this ICE rating system, it seems to me that a minimum ICE rating of 80, which equals a 20% reduction in outdoor water use, should be required after Jan 1, 2012. An ICE rating of 80 could easily be supported as a standard, given the convincing data in the 315-page report.

Why should the Energy Commission use the the 315-report as a starting point for an irrigation controller efficiency (ICE) rating system?

- The 315-page report is the most meaningful test of thousands of controllers in the field, over extended time, in the hands of homeowners and contractors. It shows a meaningful difference in irrigation efficiency.
- The 315-page report is the first report in this 5 year field study funded under Proposition 13. Additional reports will provide continuing performance reports of irrigation efficiency.
- This 315-page report and subsequent reports provide the ONLY meaningful data that can provide a meaningful measure of irrigation efficiency before the Jan 1, 2012 deadline set in AB1881.

## What are the deficiencies of the 315-page report and its sequels?

- The 315-page report and its sequels are limited to 5 years. The 315 page report and its sequels cannot answer the Energy Commission's need for on-going evaluation of irrigation controller efficiency.
- The 315-page report and its sequels look for water savings between pre- and post-installation, which does NOT measure irrigation controller efficiency in new construction.

The 315-page report has answers for both of these problems in its discussion and use of Theoretical Irrigation Requirements (TIR). The TIR provides a basis for an ICE rating on controllers installed on new construction where there are no pre-installation water records to use for comparison.

To use the procedure outlined for the TIR, the Energy Commission will need access to consumer water bills. This access may require changes in law or in building codes which will take time. This is another reason to rely on the 315-page report and its sequels. A move to ICE ratings, based on TIR, must be shaped through careful consideration of crop coefficients and other factors.

Sincerely,

Andrew Davis