






RAIN GAUGES

EQUIPMENT REVIEW

The last couple months of 2014 proved to be wet ones, providing California with much-needed rain and hopefully some relief from the looming drought conditions. All of this rain has started us thinking here at **The Rain Events** – should industrial facilities install rain gauges to record the amount of precipitation they received at their location? For a while, we thought that it would be mandatory for permittees under the new Industrial General Permit (effective July 1, 2015); but that requirement was removed from the final version of the Permit. However, we strongly urge industrial facilities to procure and maintain their own rain gauge. As past Rain Events newsletters have shown, recording your own rainfall acts as cheap insurance against the claims of third-party litigators. Rain events are not homogeneous, so it is entirely possible that a facility even a few blocks away could receive significantly different rainfall.

In light of this, we at **The Rain Events** set about trying to find a good (and affordable) rain gauge to help you in recording your daily rainfall numbers. There are so many to choose from, which is the best and most reliable? For this article, we purchased five different rain gauges from different price brackets, and performed a series of tests on them to see how they compared with each other. Our first test was an “uncontrolled” drip test, where we carefully poured exact measurements of water into each device in a slow, steady stream. We then performed a more controlled drip test, where we dripped an exact amount of water into each device over a period of twenty minutes. Each test was repeated five times. Finally, we took all of the rain gauges outside, and tested them in a simulated rain shower that we rigged up using a garden sprinkler and a flow meter. Bear in mind that we were checking for device precision, not accuracy – there is an important difference. Precision is the device’s consistency with itself, while accuracy is the device’s consistency with the actual rainfall amount. Because the collection part of each gauge we tested had a different surface area and some were very irregular in shape, it was too difficult to develop a good quick test for accuracy – so for this article we tested for precision only.

Now, the results. After running our battery of tests, we were surprised to discover that the cheapest device outperformed most of the more expensive rain gauges! Not only that, the biggest, fanciest rain gauge never actually worked. *(Continued on next page)*

Rain Gauge Review					
					
Model	Oregon Scientific RGR126 Rain Gauge	La Crosse WS-9004U Wireless Rain Center	Chaney Instrument 5-Inch Capacity Rain Gauge	Acu-Rite 01057 Weather Environment System	Acu-Rite 00896A1 Basic Rain Gauge
Price	\$59.95	\$25.42	\$8.84	\$159.98	\$34.90
Recommended	Recommended	Recommended	Recommended	Not Recommended	Not Recommended
Setup	★★★★	★★★★	★★★★★	★★★	★★★★★
User Interface	★★★★	★★★	★★★★★	★★★	★★★★
Ease of Use	★★★★	★★★★	★★★	★	★★★★
Features	★★★	★★	★	★★★★★	★
Precision	★★★★	★★★★★	★★★★	N/A	★
Total	★★★★	★★★★ 1/2	★★★★ 1/2	★★	★★

(Continued from page 1) To see the numeric results for each of these devices, check out the sidebar below. One thing that we found very interesting and disappointing was that we consistently encountered problems with the Acu-Rite brand of rain gauges. We couldn't get the 5-in-1 Weather System to read any rain, and the Acu-Rite basic rain gauge had some serious consistency problems. We designed a comparison chart (above) to highlight the strengths and weaknesses of each of these rain gauges. Also, be sure to watch the video we made (see link on the right) for a more in-depth review of each of these devices. ☔

Digital Rain Gauge Test Results

For our comparison, we ran a number of different tests on each of the **digital** rain gauges (well, the ones that worked) to determine the consistency of the readings. Since we were looking for consistency in the device's measuring capabilities, we ran each test five times (reflected on the vertical axis) Because each device has a different size rain collector, the results will not match from rain gauge to rain gauge. Look for consistency in the numbers for each device.

Oregon Scientific Rain Gauge

Uncontrolled Drip Test

	2.3 oz	8.0 oz	16.0 oz
Test #1	0.31	0.98	1.97
Test #2	0.28	0.98	1.97
Test #3	0.31	0.94	1.85
Test #4	0.28	0.98	1.85
Test #5	0.31	1.02	1.85

Standard Deviation (in inches): 0.03

Controlled Drip Test

	8.0 oz
Test #1	0.98
Test #2	0.98
Test #3	0.94
Test #4	0.98
Test #5	1.02

Stan. Dev: 0.03

La Crosse Rain Gauge

Uncontrolled Drip Test

	2.3 oz	8.0 oz	16.0 oz
Test #1	0.49	1.65	3.19
Test #2	0.49	1.65	3.34
Test #3	0.51	1.57	3.36
Test #4	0.47	1.61	3.27
Test #5	0.51	1.61	3.36

Standard Deviation (in inches): 0.03

Controlled Drip Test

	8.0 oz
Test #1	2.06
Test #2	2.08
Test #3	2.08
Test #4	2.08
Test #5	2.10

Stan. Dev: 0.01

Acu-Rite Basic Rain Gauge

Uncontrolled Drip Test

	2.3 oz	8.0 oz	16.0 oz
Test #1	0.36	0.90	3.13
Test #2	0.34	1.63	1.63
Test #3	0.46	1.27	3.88
Test #4	0.28	0.46	2.74
Test #5	0.25	1.23	2.67

Standard Deviation (in inches): 0.38

Controlled Drip Test

	8.0 oz
Test #1	2.32
Test #2	2.55
Test #3	2.55
Test #4	2.58
Test #5	2.77

Stan. Dev: 0.16

The Acu-Rite 5-in-1 Weather Environment system did not register any rain, so it is not listed here. We also did not perform these tests on the Chaney Instrument 5-inch capacity rain gauge since they are not needed on a manual instrument.

"To Do List" for January:



- ☔ Sample the first or second qualifying storm event if you have not yet done so. Get the observation and sampling forms ready. Prepare your sample kits.
- ☔ Perform and document your monthly storm water inspections (Form 4). You should have one or both samples collected by now.
- ☔ Perform your third quarter non-storm water observation before the end of March (Forms 2 & 3).

Watch Us Test the Rain Gauges



<https://www.youtube.com/watch?v=ZdhL8-H-LS0>

QISP Training Remember These Dates

- March 2015:** Qualifications begin for the QISP Trainer of Record (Instructor) selection process
- June 15-16, 2015:** QISP Instructor training for selected TORs
- July 2015:** First set of instructors (TORs) / Compliance Group Leaders (CGLs) approved
- Fall 2015:** QISP Training Rollout
- Winter 2015:** QISP Open Enrollment

Please contact us if you have any questions ...

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Need a SWPPP? Give us a call at (209) 334-5363, ext. 110

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PRODUCT SPOTLIGHT

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Simply insert the filter, replace the grate, and trim the excess material for a custom fit and clean appearance. The yellow webbing secures the filter to the grate and doubles as lifting straps allowing for quick and easy removal of the filter and grate. The sediment collection cone has four overflow portals to ease congestion during heavy storm events.

Product Specifications:

- Material: 8-ounce non-woven geotextile
- Strapping: Weather resistant 2" polypropylene webbing
- Flow Rate: 90 GPM/foot
- Dimensions: 48" x 36"

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Elima-Drip Pads

Eliminate drips underneath your vehicles and equipment with Elima-Drip drip containment pads. Elima-Drip pads are weighted absorbent pouches contained in heavy-duty vinyl sleeves, which protect the spill pads from accidental movement. The 50"x20" pad is capable of containing up to 50 ounces of oil, and the 30"x20" pad can contain up to 29 ounces. Best of all, these pads are reusable! Simply replace the pouch inside the vinyl sleeve.

Product Specifications:

Outside Material: Heavy-duty vinyl sleeve

Spill Containment Media: Absorbent pads

Dimensions: 50"x20" or 30"x20"

\$48.00
(30"x20")

\$58.00
(50"x20")



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Storm Water Contest ...

Each month, we invite our readers to participate in a contest to test their knowledge of the Industrial General Permit and their storm water compliance program. We enter all submittals to our monthly newsletter question into a drawing, and one person is selected at random to receive a \$25 gift card.

Last Month, the question was ...

What is the correct way to install fiber roll?

Pete Townsend submitted the winning answer! The correct way to install fiber roll depends on the slope, but there are two key steps – the fiber must be **staked every 4 feet** and **keyed in**.

Pete wins a \$25 gift card to P.F. Chang's to enjoy a some lettuce wraps!

This Month's Contest Question ...

Should rain gauges be installed next to tall buildings or trees? Why or why not?

By January 31, 2015, submit your response to the above question by sending an email to steravskis@wgr-sw.com. All persons submitting the correct answer will be placed in a drawing. The winner will receive a \$25 gift card to Starbucks Coffee.



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