

# PRODUCT REVIEW

## Digital Rain Gauges Compared

Carl Unkrich – Southwest Watershed Research Center

Is there a weather nut in your family? Are you that weather nut? With the holiday gift-giving season looming, *Southwest Hydrology* decided it was a good time to look at low-cost digital rain gauges designed for home use. We found three such gauges priced under \$75 and tested them during Tucson's monsoon. Our tests also included a traditional clear plastic gauge by Tru-Chek.

Two of the digital gauges employ a pair of small, calibrated "buckets" balanced on either side of a pivot below the collection funnel. The buckets alternately fill and tip as they pivot. The number of tips is counted and transmitted by radio to a remote base station receiver.

The Wireless Rain Gauge by LaCrosse Technologies has a bucket volume equivalent to 0.01 inch of rainfall, and claims a signal range of 80 feet between the point of collection and base station. The setup requires two AAA and two AA alkaline batteries (not included). Battery access in the collector is excellent, requiring only a coin to undo the single large screw. The outer cover is easily removed, allowing access for cleaning and installing the two mounting screws through the base. The base station displays both bar graphs and numerical values of rainfall amounts over the previous 6-day, 6-week, or 6-month interval, as well as total accumulation. Setup and operation is relatively straightforward and adequately documented.



From left, the LaCrosse, Torrent, and Oregon Scientific digital gauges, and Tru-Chek (in back) set up for testing.

Oregon Scientific's Long Range Rain Gauge also uses a tipping bucket design, with a bucket volume of 0.04 inch (1 mm). Transmitter and receiver come with the required two AA batteries pre-installed, but those in the rainfall collector were already dead, and accessing the battery compartment required removing 10 small screws.

The rainfall collector has four external feet with mounting holes for securing to a level surface. The base station provides a numerical display of the 9-day rainfall history, total accumulation, and temperature at the base station. However, the manual was not easy to follow.

The Torrent Rain Gauge uses a novel design with no moving parts. Rain is funneled into a calibrated tube that forms uniform-volume drops, which are counted. This design allows a remarkable depth resolution of 0.001 inch. There is no remote display, but the gauge itself displays total accumulated rainfall. Torrent claims the gauge is accurate for rainfall intensities as high as 10 inches per hour—thus the name. The gauge comes with a battery installed, and can be mounted on the end of 1-inch PVC pipe or an optional universal mounting bracket.

The three electronic rain gauges and the Tru-Chek were mounted side-by-side on a test stand (see photo) and accumulated about 4.5 inches during 11 rainfall events between July 20 and Aug. 23. The electronic gauges all tended to show greater depths than the Tru-Chek (see graph). But the largest discrepancy corresponded to the biggest rainfall event, which occurred immediately after departure for a six-day vacation. Despite adding a layer of heavy mineral oil, the Tru-Chek appeared to suffer

	LaCrosse	Oregon Scientific	Torrent
precision (inches)	0.01	0.04	0.001
accuracy claimed (%)	3	NA	5
wireless range (feet)			
claimed	80	300 (free air)	NA
tested (through walls)	80	about 80	NA
ease of setup, use	good	mediocre	very good
Web price range (\$)	45 - 55	42 - 50	39 - 60

some evaporative losses, illustrating an advantage of the electronic gauges. Torrent claims that tipping bucket gauges can under-record, particularly in heavy downpours. In the trial period, the Torrent gauge did measure consistently higher, although if one takes into account the accuracy limits of the Torrent and LaCrosse gauges, the data usually overlap.

Ranges of the two wireless units were measured within the reviewer's home and the LaCrosse gauge achieved its advertised range even with several intervening walls. The Oregon Scientific gauge claims a 300-foot free air range, but under test conditions involving transmission through walls, its range was similar to that of the LaCrosse gauge.

Which gauge should you buy? There is no clear winner. Torrent has a novel and simple design; LaCrosse was superior in ease of use. Oregon Scientific's product includes a temperature gauge, but a slightly more expensive LaCrosse model includes temperature. The choice is yours.

Contact Carl Unkrich at [cunkrich@tucson.ars.ag.gov](mailto:cunkrich@tucson.ars.ag.gov). Visit [www.crosse-technology.com](http://www.crosse-technology.com), [www.oregonscientific.com](http://www.oregonscientific.com), and other weather instrumentation sites.

