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Norum Comments Sprinkler Spray Bodies

Additional submitted attachment is included below.

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This is a scientific commentary of the points raised generally in the paper we sent previously (*A Project to Develop a Protocol to Determine the Sprinkler Operating Efficiency of Turf Sprinklers*). I am a member of an Irrigation Association (IA) SWAT committee engaged in all aspects of irrigation equipment standards. From about 1995 to 2016 I was a member of ISO TC- 23/SC-18 committee developing international standards on irrigation and drainage equipment. I have an extensive background related to the testing of irrigation system programs.

First, fundamental is to test equipment in the configuration and under the conditions it is designed to operate in and as offered for sale to the public. The jet interference phenomenon documented in the paper shows the danger of computerized attempts to short circuit the process (contrast Figure 4 results as measured with Figure 5 as computer simulated to avoid jet interference). In fact, virtually all the manufacturers I am familiar with are guilty of this perversion. The second reality is that if manufacturers are responsible for guaranteeing the results, they must define the conditions under which the product is test operated. The test protocol under which the sprinklers are to be tested is shown in the paper.

The IA SWAT committee is working on the development of this protocol. We introduced in the first draft of "Weather Based Landscape Irrigation Control System" the concept that controller performance must be both Adequate and Efficient. The protocol set standards on both parameters. Fortunately, the industry's grasp of the technology was so good that the test results on the first 25 controllers tested showed efficiencies of 95% or better.

The sprinkler test protocol allows for a measure of the percolation losses and the over spray losses. We have ignored the evaporation losses because of the inherent high cost of these tests. These losses are thought to be in the range of 2-3%.We are in effect accounting for all water that lands on the ground.

The almost exclusive use of distribution uniformity (DU) is a problem and a sad commentary on the lack of scientific rigor in the irrigation community. The IA SWAT activity as shown in the paper is an effort to overcome this deficiency. The current industry effort to institutionalize the use of pressure regulators is a marketing ploy to simplify the product specification process by requiring the public to pay for the cost, energy loss, and maintenance problems associated with pressure regulators. Further, the effect of pressure regulators on application efficiency is largely unstudied.

I urge you to set rules related to application efficiency and ignore pressure regulation rules. With pressure regulation as an option, homeowners can require and purchase the option if their situation warrants it.