33 Intake Rate: Sprinkler Infiltrometer

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33-1 INTRODUCTION

For several decades researchers have tried to develop sprinkling infiltrometers that duplicate the rainfall characteristics of a natural storm. Such duplication is extremely difficult. In some instances the rainfall characteristics of geographical regions are not known in sufficient detail to allow accurate descriptions of the storms, or if the rainfall characteristics are known the researcher may not be able to find a device capable of reproducing all desired characteristics. Given the fact that the nozzle or drop-forming device will not give complete simulation, choices must be made among the rainfall parameters to simulate. Such decisions must be made even though research has not yet clearly established the relative importance of each parameter. These choices must then depend upon the nature of the project and criteria developed by the investigator.

Attempts to simulate natural rainfall which began in the early 1930s and continued through the 1940s were reviewed in an excellent article by Mutchler and Hermsmeier (1965). Two basic types of simulators were developed. One group of simulators produced rainfall by forming drops on the tips of yarn or small-diameter glass, stainless steel, brass, or polyethylene tubes (Ekern, 1950; Barnes & Costel, 1957; Adams et al., 1957; Mutchler & Moldenhauer, 1963; Chow & Harbaugh, 1965). The second group of simulators used nozzles to form drops. Initially, nozzles were usually designed to spray upward or horizontally from a fixed position to increase wetted area and reduce the application intensity (Wilm, 1943). Impact velocity of drops produced in this way was low compared to that of normal raindrops.

In the late 1950s, Meyer and McClune (1958) developed the Rainulator, which produced rainfall characteristics more nearly approximating the kinetic energy levels of natural storms. Bubenzer and Meyer (1965) used oscillating nozzle systems to reduce the period of intermittency of the Rainulator. In the late 1950s a sprinkling infiltrometer was developed...

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