

# In Fan Type Nozzle Investigation of the Effect of the Distance Between the Nozzle and Target Surface on Irrigation Performance

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The irrigation methods which are defined as whole of the entire structure, tools and machines in the process of transmission of water to the plants can be classified under two headings to be the surface and the pressurized. In our country, approximately 92% of the agricultural irrigation is performed with surface irrigation systems. In the long-run, this methods is often caused to see the soil erosion and the drainage which because of the difficulties in the control of parameters such as evaporation, crop water requirement, runoff determine the amount of water required for irrigation. Therefore, in many parts of our country are started to see salinity, desertification and also largest decreases in yield. The most typical example of this is Şanlıurfa Harran Plain irrigated for last 20 years. The desertification in the soil as a result of surface irrigation, the farmers are inevitably forced to cross the pressurized methods the more modern from surface irrigations. As a result of strain, farmers pass the pressurized irrigation methods with an increasing trend, or are in quest to passing. As a result of quest, were relevantly established the large and small numerous firms. Since there is not majority R & D infrastructure of firms established, it's could not develop effective-efficient systems which are suitable for the area and vegetation, and however have been able to standard product offering for consumers.

The pressurized irrigation methods according to the route of administration are assessed in three classes to be sprinkler, micro-sprinkler and drip. Sprinkler irrigation systems due to the advantages, such as the implementation of without the need for leveling on uneven terrain topography and the high light textured soils of water intake velocity, come to the fore than other pressurized irrigation systems. In the sprinkler irrigation systems the nozzle which is largely determined the performance and operating parameters of the system, is also the smallest and most cost-effective active component of system. Therefore, any improvement on the nozzle, system performance will be highly significant increase with the lowest cost. Sprinkler irrigation systems, investigating the nozzle flow and heat transfer characteristics and hence there is no study demonstrating the relationship between system performance and these characteristics. In all studies on the subject have been attempted to identify the system's performance, so it's not qualification setting out the relationship between the system performance and components especially nozzle. For this reason, for efficient and effective irrigation not possible to make optimal nozzle design use of these studies for efficient and effective irrigation. In this respect, additional studies are required to define the relationship between the system performance and the flow and heat transfer characteristics for the design of optimal nozzle.

In this study, the effect of a fan type nozzle on the irrigation performance of the distance between the nozzle and target surface was investigated. In this framework, firstly solid model design of the fan type

nozzles with five different nozzle-target surface areas (Lule outlet diameter / nozzle target distances ( $d / h$ ) = 1.716, 1.433, 1.39, 1.224 and 1) was made in SolidWorks. In the second step, the designs of the nozzles were made with 3d printer. Lastly, the irrigation performance of the nozzles was examined in an experimental set. In the measurements made, the Coefficient of Partition Coefficient (CU), which defines the uniform flow structure, increases while the irrigation area decreases as  $d / h$  ratio increases.

**Keywords**— Agricultural irrigation, sprinkler irrigation, nozzle design