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AIR CORE DIAMETER, SPRAY CONE ANGLE AND SPRAY BREAKUP LENGTH OF SIMPLEX ATOMIZER WITH VARIOUS EXIT ORIFICE DIAMETERS AND REYNOLDS NUMBERS

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ABSTRACT

Simplex atomizer is the simplest form of swirl atomizer. The principal function of the atomizer is to break the liquid into very small droplets. It became challenging to designing the atomizer due to vary application and performance characteristics in wide range of industries. It require an understanding hydrodynamics process inside the nozzle to predict the different hydrodynamics parameter involved and then evaluate the different spray characteristics in terms of nozzle geometry, injection condition and liquid properties. Due to its important in various applications, many studies have been conducted to understand the characteristics of the resulting sprays. The present study investigates the spray characteristics of swirl atomizer with various exit orifice diameter using water at room temperature as the working fluid will undergo experiment test rig with certain range of volume flow rate. The investigation revealed the effect exit orifice diameter on the atomizer spray characteristics including spray cone angle, breakup length and air core diameter. Experiments revealed that the spray cone angle, air core diameter and break up length increased with the increase of exit orifice diameter. Furthermore, it was found that the spray angle and air core diameter increased with increasing injection pressure, while the break up length shows the opposite trend.

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TABLE OF CONTENTS