

عنوان مقاله:

Effect of Low ALR on the Spray Characteristics of a Pressure-swirl Duplex Nozzle

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نویسندگان:

R. A. Dafsari - School of Mechanical System Engineering, Chonbuk National University, Jeonju, Republic of Korea

R. Chandrahasan - School of Mechanical System Engineering, Chonbuk National University, Jeonju, Republic of Korea

C. Ahn - Aerospace R&D Center, Hanwha Aerospace Seongnam, Gyeonggi-do, 13488, Republic of Korea

J. Lee - Faculty of Mechanical System Engineering, Chonbuk National University, Jeonju, Republic of Korea

خلاصه مقاله:

The objective of this study is to investigate the effect of the air-to-liquid ratio (ALR) in a low range on the characteristics of the spray issuing from a pressure-swirl duplex nozzle. In this study, the pressure-swirl duplex nozzle was used as an atomizer with non-swirl shroud air. The shroud air was radially discharged inward across the nozzle face to avoid the contamination of the nozzle tip. Jet A-1 fuel was used as the working fluid. The analysis of the spray characteristics was carried out by using a phase Doppler anemometry (PDA) system and a laser based planer imaging system. The flow rate, discharge coefficient, spray structure, spray cone angle, velocity and drop size distributions were analyzed. The results show that the discharge coefficient of the pilot nozzle is higher than that of the main nozzle and the combined pilot and main nozzles. The spray angle tends to decrease almost linearly with increasing ALR. The shape of the spray gradually changes from a hollow cone to a full cone with increasing ALR, as revealed in the axial velocity distributions with an increase in the axial distance. The weighted mean SMD (WMSMD) increases by ۱.۲ as the ALR increases, but thereafter, it decreases again

کلمات کلیدی:

Air to liquid ratio, Duplex nozzle, Laser diagnostics, Multiphase flow, Spray droplet size

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