

Abstract Submitted  
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**Jet Velocity Profile Effects on Spray Characteristics of Impinging Jets at High Reynolds and Weber Numbers**<sup>1</sup> NEIL S. RODRIGUES, VARUN KULKARNI, PAUL E. SOJKA, Purdue University — While like-on-like doublet impinging jet atomization has been extensively studied in the literature, there is poor agreement between experimentally observed spray characteristics and theoretical predictions (Ryan et al. 1995, Anderson et al. 2006). Recent works (Bremont and Villermaux 2006, Choo and Kang 2007) have introduced a non-uniform jet velocity profile, which lead to a deviation from the standard assumptions for the sheet velocity and the sheet thickness parameter. These works have assumed a parabolic profile to serve as another limit to the traditional uniform jet velocity profile assumption. Incorporating a non-uniform jet velocity profile results in the sheet velocity and the sheet thickness parameter depending on the sheet azimuthal angle. In this work, the  $1/7^{\text{th}}$  power-law turbulent velocity profile is assumed to provide a closer match to the flow behavior of jets at high Reynolds and Weber numbers, which correspond to the impact wave regime. Predictions for the maximum wavelength, sheet breakup length, ligament diameter, and drop diameter are compared with experimental observations. The results demonstrate better agreement between experimentally measured values and predictions, compared to previous models.

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