

Abstract Submitted  
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**Coaxial twin-fluid atomization with pattern air gas streams** CHIN HEI NG, ALBERTO ALISEDA, University of Washington — Coaxial twin-fluid atomization has numerous industrial applications, most notably fuel injection and spray coating. In the coating process of pharmaceutical tablets, the coaxial atomizing air stream is accompanied by two diametrically opposed side jets that impinge on the liquid/gas coaxial jets at an angle to produce an elliptical shape of the spray's cross section. Our study focuses on the influence of these side jets on the break up process and on the droplet velocity and diameter distribution along the cross section. The ultimate goal is to predict the size distribution and volume flux per unit area in the spray. With this predictive model, an optimal atomizing air/pattern air ratio can be found to achieve the desired coating result. This model is also crucial in scaling up the laboratory setup to production level. We have performed experiments with different atomized liquids, such as water and glycerine-water mixtures, that allow us to establish the effect of liquid viscosity, through the Ohnesorge number, in the spray characteristics. The gas Reynolds number of our experiments ranges from 9000 to 18000 and the Weber number ranges from 400 to 1600. We will present the effect of pattern air in terms of the resulting droplets size, droplet number density and velocity at various distances downstream of the nozzle where the effect of pattern air is significant.

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