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A model for predicting drop size distribution in effervescent jet breakup by bubble-bursting HRISHIKESH GADGIL, B.N. RAGHUNANDAN, Department of Aerospace Engineering, Indian Institute of Science, Bangalore, 12 — This paper deals with the problem of prediction of mean drop size in effervescent atomizers with bubbly flow. Current studies in literature indicate that the progress in the development of a model for drop size prediction in effervescent sprays is not satisfactory. This model, which gives the drop size distribution of effervescent spray generated by rapid expansion of bubbles, is based on energy and entropy principles. A spherical control volume of liquid jet with bubble inside is considered as the initial state. The final state is taken as the fine droplets formed after the breakup. The model works with the constraints of conserving mass and energies of the system. The objective of obtaining the drop size distribution is transformed to a new constraint of maximization of entropy of the system (i.e. finding drop size classes with maximum probability of occurrence). Thus, it becomes an optimization problem to which a method of Lagrange multipliers is applied. The outcome of this exercise is the most probable distribution of droplets in various size classes and it can be converted into more meaningful averages such as SMD that is useful for mixing and combustion applications.

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