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Experimental method to measure liquid extensional properties during atomization. MARIE-CHARLOTTE RENOULT, CORIA-UMR 6614 INSA Rouen Normandy, CHRISTOPHE TIREL, CORIA-UMR 6614 Rouen University, CHRISTOPHE DUMOUCHEL, CORIA-UMR 6614 CNRS — An experimental method has been developed to measure the extensional properties of a viscoelastic polymer solution experiencing atomization. It is based on the statistical and 3D multi-scale analysis of the capillary thinning of liquid ligaments controlled either by elasticity or viscosity. The method principle will be first presented and validated using an ensemble of emulated ligaments. Then, the method procedure will be described from a free jet imaging setup to the extraction of the liquid extensional properties, i.e. the relaxation time and the terminal elongational viscosity. This procedure will be applied to a series of experiments conducted with several viscoelastic solutions, flow rates and quasi-cylindrical nozzles. Finally, the influence of the polymer concentration, of the jet velocity and of the nozzle dimensions on viscoelastic properties will be discussed.

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