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Flow Characterization in a Spinning Film Apparatus[1] ALONSO ALVARADO-SAVARAIN, ELLEN LONGMIRE[2], University of Minnesota- Aerospace Engineering & Mechanics — Flow generated in a mixing apparatus with similarities to but distinct deviations from a standard Taylor-Couette geometry is examined. Here an inner cylinder rotates about a vertical axis as an impeller within a stationary outer cylinder. The radius ratio is 0.95 and the aspect ratio of outer cylinder length to gap width is 27.5. The inner cylinder is hollow and shorter than the outer cylinder, leaving a bottom gap of 2.5 times the inter-cylinder gap width. The apparatus volume is partially full of liquid such that an inner free surface forms during operation. Velocity statistics in the side and bottom gaps are determined by laser Doppler velocimetry for characteristic Taylor (or Reynolds) numbers based on gap width in the range 1100-4700 which represent wavy vortex and turbulent regimes in Taylor-Couette flow. Experimental results for the aforementioned Reynolds numbers in conditions where the liquid present in the system is 30%, 43% and 52% of the total volume are shown. Additional results having the system modified to allow axial throughflow maintaining dimensions and liquid holdup equal to the batch conditions are also shown.

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