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## Experimental Investigation of Fiber-Foam Multiphase Flow

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In a 2014 report, the DOE recognized the paper industry as the third largest consumer of energy in the United States, accounting for 13% of the manufacturing energy consumption used nationally. Because water is predominantly the carrier fluid during paper manufacture, evaporative drying at the end of the manufacturing process can account for 2/3 of paper making energy consumption. Accordingly, fiber foams, where the carrier fluid is a bubbly foam, present a path for a predicted 10%-40% energy savings, without sacrificing product quality. To design industrial processing equipment, a representative fiber foam made of aqueous sodium dodecyl sulfate is examined as a function of gas fractions (20% to 80%) and fiber content (0% to 2%). A pressure driven pipe flow apparatus is designed and used to simulate the paper making process. Constitutive models for fiber-laden foam will subsequently inform computational models for designing nozzles and processes that will demonstrate the utility of this carrier fluid for the paper making industry.

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### References

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