

Abstract Submitted
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Flow field measurements along a row of confined cylinders¹ BARTON SMITH², ERIC THORSON³, Utah State University, DONALD MCELIGOT⁴, Idaho National Laboratory — The results of flow experiments performed in a cylinder array designed to mimic flow phenomena in a lower plenum of a “Very High Temperature” nuclear reactor are presented. Pressure drop and velocity field measurements were made. For initial velocity measurements, a domain centered on one cylinder extending upstream and downstream to the next rows of cylinders was measured, and 27 Reynolds number values in the range $237 < Re < 56,000$ were examined. The pressure drop between each set of cylinders was measured simultaneously. Subsequently, high-resolution data sets consisting of three subdomains (one in front of, one below, and one behind a cylinder) revealed the mean and fluctuating separation location and the boundary-layer state for each case. Based on these measurements, five regimes of behavior are identified that are found to depend on Reynolds number. It is also found that the recirculation region behind the cylinders is shorter than those of half cylinders placed on the confining walls representing the symmetry plane.

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²Assistant Professor

³Graduate Student

⁴Technical Leader, Thermal Science

Barton Smith
Utah State University

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