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Interaction of Vortex Rings and Steady Jets with Multiple Permeable Screens MUSTAFA N. MUSTA, Southern Methodist University, PAUL S. KRUEGER, Southern Methodist University — DPIV measurements of the interaction of a vortex ring impinging on a rudimentary porous medium formed from several parallel, transparent permeable screens was made previously for screens with 49.5%, 58.95, and 84% open area ratio (ϕ) and jet Reynolds number (Re) in the range 1000-2000. The results indicated the vortex ring split into smaller vortical structures after its interaction with the first screen. For the $\phi = 84\%$ screens the flow formed jets which reorganized into a transmitted like vortex ring which was not observed for lower ϕ . The present work seeks to provide a more detailed investigation of the flow through the matrix of screens using DPIV. Measurements were made for vortex rings and steady jets interacting with screens with variable spacing and open area ratios of 49.5%-84%. The vortex rings were generated with a piston-cylinder vortex ring generator using piston stroke-to-diameter ratios and Re in the ranges 2-4 and 2000-4000, respectively. The vortex ring results show similar flow structures observed qualitatively in the lower Re tests. The steady jets rapidly expand to fill the matrix of screens after interacting with an approximately fixed number of screens for low ϕ and the decay of kinetic energy is strongly influenced by ϕ .

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