

Abstract Submitted  
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**Vortex Ring Interaction with a Heated Screen**<sup>1</sup> JASON SMITH,  
PAUL S. KRUEGER, SMU — Previous examinations of vortex rings impinging on porous screens has shown the reformation of the vortex ring with a lower velocity after passing through the screen, the creation of secondary vortices, and mixing. A heated screen could, in principle, alter the vortex-screen interaction by changing the local liquid viscosity and density. In the present investigation, a mechanical piston-cylinder vortex ring generator was used to create vortex rings in an aqueous sucrose solution. The rings impinged on a screen of horizontal wires that were heated using electrical current. The flow was visualized with food color and video imaging. Tests with and without heat were conducted at a piston stroke-to-jet diameter ratio of 4 and a jet Reynolds number (Re) of 1000. The vortex rings slowed after passing through the screen, but in tests with heat, they maintained a higher fraction of their before-screen velocity due to reduction in fluid viscosity near the wires. In addition, small “fingers” that developed on the front of the vortex rings as they passed through the screen exhibited positive buoyancy effects in the heated case.

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