

Abstract Submitted
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Vortex Ring Properties Before and After Interaction with a Screen¹ JOHN HRYNUK, DOUGLAS BOHL, Clarkson University — The interaction of a vortex ring with a screen was investigated using Molecular Tagging Velocimetry (MTV). The screen had a porosity of 65% and a small wire diameter ($D_w=0.0178$ cm) with respect to the vortex ring diameter ($D_w/D_{ring}=5.23 \times 10^{-3}$). The results show that as the vortex ring approached the screen the initial interaction was much like that for a vortex ring/solid wall interaction. Specifically, the vortex ring slowed down and expanded as it approached the screen. A secondary vortex was formed that separated from the wall and orbited the primary vortex. Because the wall was porous the primary vortex ring passed through the wall, however, the secondary ring slowly convected back upstream. Data showed that the peak vorticity of the primary vortex dropped by nearly a factor of 4 after passing through while the radius increased in size only slightly (15%). The circulation of the primary vortex before and after the interaction decreased by more than a factor of 2 confirming conclusions from prior flow visualization results. The secondary vortex was both smaller and weaker than the primary vortex as is observed for vortex/wall interactions.

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