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**Dynamics of non Newtonian vortex rings** C.A. PALACIOS-MORALES, C. BARBOSA, R. ZENIT, Universidad Nacional Autonoma de Mexico — The dynamics of formation and evolution of non-Newtonian vortex rings generated in a piston-cylinder arrangement are studied. The ratio of the piston displacement $L_m$ to the internal cylinder diameter $D_0$, the piston velocity $U_p$ and fluid properties determine the vortex properties and evolution. Measurements of the 2D velocity field were obtained with a PIV technique. The vortex circulation $\Gamma$ was computed considering a vortex identification scheme ($Q$ criterion). Experiments with fluids with different rheological properties (shear thinning and viscoelastic) are presented. Our Newtonian experiments agree with previous investigations. For shear-thinning liquids, we observed that the final vortex circulation decreases with the fluid power index, $n$. We show that the total circulation ejected from the cylinder is reduced when the thinning property of the liquid increases; thus, the circulation confined inside the vortex ring, is reduced too. For vortex rings in a viscoelastic liquid, the formation of a 'negative wake' (returning flow) and a second vortex ring with opposite whirl are observed. We show that the negative wake results from the high extension rates produced during the vortex formation.

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