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Design, Construction and Operation of a Light Gas Gun JOHN BORG, Marquette University, THOMAS DOWNS — In order to conduct Richtmyer-Meshkov instability experiments in shock accelerated thin liquid sheets, a light gas gun was designed and constructed at Marquette University. This paper contains the basic predictions and construction techniques utilized in the design and operation of a double diaphragm light gas gun. The compressed air gas gun is used to accelerate a nylon projectile up to a velocity of 300 m/s. Pretest simulations were performed using two different hydrodynamic computational codes in order to simulate the inboard gas dynamics and projectile velocity. These simulations are compared with post test projectile velocity data. The simulations compare favorably to the data, including the one-dimensional calculations which do not account for frictional losses or diameter changes between the breech and barrel. Finally, both the computational simulations and the experimental measurements are compared to simple analytical predictions of the projectile velocity.

John Borg
Marquette University

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