Abstract Submitted
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Analysis and Development of a Quick Acting Diaphragm-less Shock Tube Driver[1] ROCCO PORTARO, HOI DICK NG, Concordia University, Montreal, Canada — This work discusses the construction and performance characteristics of a diaphragmless shock tube driver. Shock waves play integral roles in many industrial, medical and scientific environments, consequently it is important to observe the behaviour of these waves and how they interact with their surroundings. The diaphragmless shock tube provides a quick and effective means of producing shock waves in gases. The major advantages compared to conventional diaphragms include, minimal downtime between repeated experiments, opening times comparable to those of conventional diaphragms and infinitely adjustable opening pressure without the use of various diaphragm thicknesses. Moreover, the diaphragmless design also eliminates fragments that are carried downstream of the shock tube once the conventional diaphragm is ruptured. The design utilized in this work is built on that of Downey et al. [M.S. Downey, T.J. Cloete, A.D.B.Yates, Shock Waves 21(4): 315-319, 2011] and is improved in order to obtain faster opening times leading to stronger shock formation. Furthermore in depth numerical analysis using the commercial CFD package Fluent is carried out to validate experimental data for driven pressures and opening times as a function of driver pressure.

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