LOW-OVERPRESSURE, LONG-POSITIVE-PHASE-DURATION FLOWS IN A 5.8 METER DIAMETER FACILITY FOR SIMULATING BLAST ENVIRONMENT FROM NUCLEAR WEAPONS

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Sandia Laboratories uses explosively driven shock tubes to determine the response of aerodynamic structures to specified, relatively high-blast, intercept environments. A technique used with the 5.8m (19ft) diameter blast simulator to generate low-overpressure, long-positive-phase-duration flow for simulating the blast environment from nuclear weapons is discussed. The effect of changing the length of the PETN primacord explosive in the 1.8m (6 ft) diameter driver on the positive-phase flow duration in the 5.8m test section is illustrated by experimental data from four tests. Eleven additional blast tests were conducted using the 55.8m long explosives to generate static overpressure between 1.72 and 75.8 kPa (0.25 and 11 psig) with durations of at least 100 ms. Two tests were repeated to establish the variance in test section blast parameters. Measured static and stagnation overpressures, positive-phase flow durations, and shock arrival times for the 15 tests are discussed, and theoretical and measured overpressures are compared.