

FIRING TESTS OF THE RAMJET MODEL WITH THE DETONATIVE COMBUSTION OF HYDROGEN IN A WIND TUNNEL AT APPROACH AIR STREAM MACH NUMBER FROM 5 TO 8

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Abstract: Presented are the results of firing tests of a model ramjet 1.05 m long and 0.31 m in diameter with an expanding annular combustion chamber operating on detonative combustion of hydrogen, in a pulsed wind tunnel at approach air stream Mach number ranging from 5 to 8 at a stagnation temperature of 300 K. Two modes of hydrogen combustion are registered in the tests, namely, continuous spin detonation and longitudinal pulsed detonation with characteristic operation frequencies of 1250 and 900 Hz, respectively. The maximum measured values of the fuel-based specific impulse and the mean thrust of the engine were 3600 s and 2200 N. A positive effective thrust acting in the direction opposite to the approach air stream has been detected.

Keywords: ramjet; supersonic airflow; detonation; hydrogen; specific impulse; thrust; wind tunnel

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