

Gasdynamic Adjustment at Modeling of Flight Conditions Appropriate $M=6$

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In this paper are presented main power and gasdynamic characteristics of C-16VK hypersonic test cell of Research Test Center of CIAM. Gasdynamic adjustment of the C-16VK test cell was carried out with the working section constructed on scheme of Ramjet/Scramjet test in free stream. Gasdynamic adjustment was conducted stage by stage in the following sequence. First, check and preparation of all technical systems and checking measuring system. Than determination of the characteristics of test cell on cold (without the heating of air at entrance) regime and determination of the characteristics of test cell on regimes with the heating of air. Finally determination of the characteristics of test cell with the loading of the working part by object. On the final stage of gasdynamic adjustment two experiments with the axisymmetric Scramjet model loaded into the working part of test cell were conducted. The first experiment was conducted with the purpose of determination of flow parameters with the object loaded into the working part and verification of experiment cyclogram. The second experiment was conducted with injection of hydrogen into the combustion chamber of object, that is the conditions on test cell simulated Scramjet flight Mach number $M = 6$. Such methodology of gasdynamic adjustment allows to determine influence of experimental object on flow parameters in the working part at different conditions of experiment (with the burning in combustion chamber of object and without the burning), and also to compare flow characteristics in the object duct.

The purpose of gasdynamic adjustment of test cell was the determination its real gasdynamic and power characteristics. Concurrently the technology of start-up and stop of test cell (cyclogram of test cell operation) was developed and control and measuring system functioning was checked.

The distributions of temperature and Mach number at the exit of the aerodynamic nozzle of test cell are received at simulation conditions of flight at $M = 6$. Values of available pressure difference and throttling characteristics for various operational modes of test cell, including the loading of working section by Scramjet model also are received.