Some aspects of research object preparation for test on high-enthalpy high-altitude bench of periodic action

Kozerod A V*, Kostinskaya M A and Aleksandrov V Yu
Moscow Institute of Physics and Technology, Institutskiy Pereulok 9,
Dolgoprudny, Moscow Region 141700, Russia
* kozerod@me.com

Conducting research trials of experimental objects on the high-altitude high-enthalpy facilities and the stands of periodic action is a complex multifactorial and multidisciplinary task. Compliance with the conditions of flow of the research object, identical to the real requires of the free-stream parameters corresponding to the flight speed at a given height. To obtain reliable results of the research workflow in the flow path of the test object need detailed preparation, in particular pressure sensors. When vacuum (about ten mbar) and the length of pulse tube several meters settling time of the measured static pressure can reach several seconds. In a comparable duration of the specified test mode there is a risk of losing a significant part obtained from the sensor information. In addition, there is a question of interpretation of indications of the sensor, especially in conditions of unsteady processes in the combustion chamber. To reduce the delay of the measured pressure, reduce the length of the pulse tube and align the sensor as close as possible to the selection location. However, close to the place of selection pressure, the location of the sensor can lead to overheating and the inability of normal functioning. To solve the tasks proposed a new methodological approach to determine the temperature distribution along the length of the pulse tube, and then according to the results obtained for the temperature distribution to install the pressure sensor at a safe distance. In addition, the approach provides the possibility of protection as the sensor itself and its electrical connections. In the present work some results of the studies.