

THE RESEARCH OF BALANCE TEST FOR SCRAMJET MODEL IN HYPERSONIC HIGH TEMPERATURE WIND TUNNEL

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This paper mainly introduces the research of Scramjet model' thrust measurement in hypersonic high temperature propulsive wind tunnel. The strain balance design, calibration and the wind tunnel test also described. The Scramjet model is made up of intake, combustor and nozzle. The strain balance is three-component and is belly-support in the wind tunnel. Balance calibration was done in laboratory and in wind tunnel in order to evaluate its character. In wind tunnel tests, first the fuel pipe and model didn't connected we measured Scramjet drag using cold airflow, and the heater of wind tunnel didn't work. Second we connected the fuel pipe and model in order to inject water which simulate disturbance of fuel system working and measured Scramjet drag. At last we measured the Scramjet drag using hot airflow at 1750K and supplying the fuel. The results show that hypersonic high temperature wind tunnel can provide air flow of Scramjet test, and flow field quality can satisfy Scramjet' thrust/drag measurement; the strain balance can satisfy testing requirement; Under given testing condition, the Scramjet model can produce positive thrust.

Keywords: Hypersonic High Temperature Wind Tunnel; Scramjet; Strain Balance; Thrust Measurement