One of the results of aerospace industry development is movement towards higher flight speeds, which often requires the development of new or making certain changes to the existing aircraft design. It is known that fire testing is mandatory step in testing of the selected materials and aircraft schemes. For close flight condition modelling it is required to simulate incident flow parameters, what almost always means high temperature and heat flux loads on the testing rigs elements. Testing rig that is considered in the current study consists of high-enthalpy air flow generator, aerodynamic nozzle and support for aerodynamic models fixing during experiment. Many of test rig elements need active water cooling. For less heat-loaded elements air cooling is used. One of the technical realization of air cooling is directed air jet that creates air curtain and prevents surface from overheating. Interaction of two supersonic co-flow jets (air and combustion products) with temperature difference up to 1000 K. The simulation purpose is to verify operability of testing rigs elements placed behind aerodynamic nozzle exit. Two stainless steel plates are placed there and needed for support of composite elements during testing. Orifices for cooling air jets are placed at the nozzle exit. Metal plates temperature should not exceed 1000 K, while stagnation temperature of incoming gas is 1650 K. Simulation of gasodynamic is perform in steady-state approach. Radiative and convective heat transfer between support and gas is simulated. Shocks observed on the leading edge of support plates. That has negative effect on air cooling efficiency in near-wall region. Recommendations concerning air curtain cooling during experiment are given.