Position of Static Cylinder Effect on Base Flows  
(Much of the conclusions drawn in this paper are based on actual experimental data obtained through the use of a portable data acquisition system.)

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Abstract

This paper presents the effect of the cylinder as a passive controller on the recirculation zone behind high-speed objects. The low-pressure recirculation zone was measured for base and wall region with a portable data acquisition system using sixteen solo sensors between reattachment and separation points at angles \(^\circ\), \(^30^\circ\), \(^60^\circ\), \(^90^\circ\). Pressure measurements were done by the transducer of National Instruments 9205 Screw Term and Data Acquisition cDAQ-1978. The measurement was done using DAQ connected to 16 solo sensors of \(-\) psi range. In a second it is capable of scanning 250 samples, followed by computing the overall average and store it on the disk. The NI LabVIEW Academic Software using DAQ through pressure sensors acquires data from all the sixteen channels and displays it on the computer screen. The experiments were carried out for overexpanded and perfectly expanded supersonic jets at Mach 2 through the C-D nozzle for area ratio . It is found that the control has marginally influenced the base and wall flow field when the control was placed at different positions along the imaginary line from separation to reattachment angled at \(^30^\circ\) to the horizontal base and the flow field in the base area along the separation line is mostly independent of its locations except near the exit of the enlarged duct where the flow field is mostly influenced by the back pressure. The control seems to be strongly effective when flow expanded is ideal. © 2020, Springer Nature Singapore Pte Ltd.
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