Effect of area ratio on base pressure and control effectiveness

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Abstract

Reducing the base drag and increasing the base pressure from aerodynamic devices involving suddenly expanded flows is of vital importance due to the higher rate of drag associated with them. The experimental effort put into understanding the variation in base pressure using active control of suddenly expanded flows employing microjets is reported in this article. The effect of microjets on the pressure ratio, NPR, and length to diameter (L/D) ratio on the percentage change in base pressure is investigated at supersonic Mach numbers of 1.7, 2.3, and 2.7, for area ratios of 2.56, 3.56, and 7.56. Apart from NPR, the L/D ratio has an influential role in percentage change in base pressure at different Mach numbers. An improvement of up to 36% in base pressure is obtained with the use of sonic microjets at a particular Mach number and L/D ratio.

Author keywords

Active control, Area ratio, Expanded flow, Mach number, Microjet

ISSN: 22775838
Source Type: Journal
Original language: English

DOI: 10.3948/journals.81179.0182019
Document Type: Article
Publisher: Blue Eyes Intelligence Engineering and Sciences Publication

References (30)