# Impact of expansion level on flowfield with sudden expansion at supersonic regimes

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**Abstract**

This paper aims to assess the control mechanism's efficiency and flow pattern in the pipe. The flow was investigated for Mach numbers M = 1.25, 1.3, 1.48, 1.6, 1.8, 2.0, 2.5, and 3.0 for a step height of 3 mm. The NPRs of the tests were from 11 to 3. The flow revealed the minimum duct requirement for a given Mach number and NPR as L = 2D. Only some selected cases where control mechanism impacts considerably are presented. In most of the cases, the flow field was the same. There is a reversal in control in the flow field; only such cases are discussed. At low Mach numbers, the flow regulator raises the pressure, and for the rest of the Mach numbers, the control findings are to reduce the pressure except at NPR = 9 at Mach M = 3.0,

a reversed trend. (C) 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Smart and Sustainable Developments in Materials, Manufacturing and Energy Engineering.

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