

## Numerical Study of Heat Transfer and Laminar Flow over a Backward Facing Step with and without Obstacle

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**Abstract :** Heat transfer and laminar fluid flow over backward facing step with and without obstacle numerically studied in this paper. The finite volume method adopted to solve continuity, momentum and energy equations in two dimensions. Backward facing step without obstacle and with different dimension of obstacle were presented. The step height and expansion ratio of channel were 4.8mm and 2 respectively, the range of Reynolds number varied from 75 to 225, constant heat flux subjected on downstream of wall was 2000W/m<sup>2</sup>, and length of obstacle was 1.5, 3, and 4.5mm with width 1.5mm. The separation length noticed increase with increase Reynolds number and height of obstacle. The result shows increase of heat transfer coefficient for backward facing step with obstacle in compared to those without obstacle. The maximum enhancement of heat transfer observed at 4.5mm of height obstacle due to increase recirculation flow after the obstacle in addition that at backward. Streamline of velocity showing the increase of recirculation region with used obstacle in compared without obstacle and highest recirculation region observed at obstacle height 4.5mm. The amount of enhancement heat transfer was varied between 3-5% compared to backward without obstacle.

**Keywords :** separation flow, backward facing step, heat transfer, laminar flow

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