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Control of flow over a backward-facing step using vertical tabs¹ HYUNGMIN PARK, WOO-PYUNG JEON, HAECHEON CHOI, JUNG YUL YOO, Seoul National University — In this study, mixing enhancement behind a backward-facing step is experimentally investigated using thin rectangular tabs attached on the trailing edge. The parameters considered are the height (l_y) and width (l_z) of the tab and the spanwise spacing between the adjacent tabs at the Reynolds number of 24,000 based on the free-stream velocity and step-height (h). The reattachment length is about 5.8h without the tab. For each tab configuration, we measure the distributions of wall pressure and reattachment length along the spanwise direction. With the tab, the reattachment length and wall pressure show significant variations in the spanwise direction. For example, with single tab of $l_y = l_z = 0.5h$, the reattachment length slightly increases at the spanwise location of tab (-0.25 < z/h < 0.25), but significantly decreases at other spanwise locations; it becomes about 2h at $z = 1.5 \sim 2h$. This indicates that the tab attached on the trailing edge drastically increases mixing behind the backward-facing step. The pressure on the backward-facing wall also decreases at most spanwise positions, showing the increase of vortical strength in the recirculating zone.

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Haecheon Choi Seoul National University

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