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Flow regimes in a T-mixer operating with a binary mixture SIMONE CAMARRI, LORENZO SICONOLFI, CHIARA GALLETTI, MARIA VITTORIA SALVETTI, University of Pisa — Efficient mixing in small volumes is a key target in many processes. Among the most common micro-devices, passive T-shaped micro-mixers are widely used. For this reason, T-mixers have been studied in the literature and its working flow regimes have been identified. However, in most of the available theoretical studies it is assumed that only one working fluid is used, i.e. that the same fluid at the same thermodynamic conditions is entering the two inlet conduits of the mixer. Conversely, the practical use of micro-devices often involves the mixing of two different fluids or of the same fluid at different thermodynamic conditions. In this case flow regimes significantly different than those observed for a single working fluid may occur. The present work aims at investigating the flow regimes in a T-mixers when water at two different temperatures, i.e. having different viscosity and density, is entering the mixer. The effect of the temperature difference on the flow regimes in a 3D T-mixer is investigated by DNS and stability analysis and the results are compared to the case in which a single working fluid is employed.

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