Abstract Submitted
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Experimental and numerical analyses of flow and mixing regimes in an arrow-like micro mixer[1] MARIA VITTORIA SALVETTI, ALESSANDRO MARIOTTI, CHIARA GALLETTI, ELISABETTA BRUNAZZI, DICI - University of Pisa — T-mixers are among the most common micro devices. We focus here on a geometrical modification of a T-mixer obtained by varying the angle between the axis of the inlet channels and that of the main conduit, so that an 'arrow-like' configuration is obtained. Previous numerical studies indicated that for this type of configuration the steady engulfment regime occurs at lower Reynolds numbers than for T-mixers. However, with further increasing the Reynolds number, an unexpected reduction of the degree of mixing is observed, due to the presence of a strong vortical structure at the center of the mixing channel. Such a behavior is not observed in T- mixers. A synergic analysis combining experimental flow visualizations and numerical simulations of an arrow-like micro mixer is presented here. Experimental flow visualizations are compared with the scalar field behavior obtained in the simulations, which is in turn connected with the vorticity fields and dynamics, available in numerical simulations. This analysis is aimed at: (i) further characterizing the steady engulfment regime and (ii) investigating the unsteady periodic regimes, eventually occurring by increasing the Reynolds number, which have not been addressed so far in the literature for this type of geometry.

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