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Break-up of a gas bubble in a uniaxial straining flow (USF) at finite Re ANTONIO REVUELTA, Div. Comb. Fosiles y Gasif, CIEMAT Madrid, Spain, JAVIER RODRIGUEZ-RODRIGUEZ, Dept. of MAE, University of California, San Diego. La Jolla, CA, USA, CARLOS MARTINEZ-BAZAN, Area Mec. Fluidos. Univ. de Jaen, Jaen, Spain — It has been shown in a recent work that a gas bubble immersed in a USF can be understood as a simplified model to describe some important aspects of the more complex problem of the turbulent break-up, provided that the Reynolds, Re, and Weber, We, numbers of the flow around the bubble are sufficiently high. Despite of its simplicity, the break-up time given by the model reproduces with reasonable accuracy experimental measurements performed in a real turbulent flow. The present investigation completes that work, exploring the effect of Re on the break-up process. Besides, to clarify the bubble break-up at $We \approx We_c$ (the critical one), we have studied the effect of various mechanisms proposed in the literature, including bubble oscillations, resonance and compressibility effects. The USF model allows us to compare the efficiency of the different breaking mechanisms helping us to determine the most important ones. On the other hand, a systematic study of the effect of viscosity (Reynolds number) on the break-up process has been performed.The dependence of We_{c} on Re has been observed to differ from the one previously reported in the literature for similar flows. Furthermore, when $We \gg We_{\mathrm{c}}$, an analytical expression for the break-up time that includes the effect of Re is also proposed.

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