

BUBBLE-SIM: THE BUBBLE GROWTH SIMULATOR

Growth and detachment of a bubble is simulated for downward gas flow through an orifice in a horizontal pipe under viscous flow. The simulation is carried out using MS excel and VBA and a combination of macros is developed for the same. The deformed shape of bubble is also simulated with time starting from zero volume till the time bubble detaches from the orifice giving the final size of the bubble after detachment. The simulation also provides final pressure inside the bubble and the time required for formation of a single bubble. Independent growth and detachment of bubble is simulated without considering effect of other bubbles on growth and detachment of the bubble. The simulation considers the effect of orifice size, liquid flow rate, liquid flow pipe diameter etc. on the instantaneous shape and final size of the bubble. The simulation can be applied to various hydrocarbon gases, ozone, nitrogen, oxygen, carbon dioxide, argon, air etc. for producing bubbles at different temperature and pressure conditions.

The simulation has got usage in generation of bubbles of desired sizes and optimization of bubble generators to produce bubbles of a particular size of any non-polar or slightly polar gas at given temperature and pressure conditions. The simulation can be used to design and optimize micro-bubble generators.