INFLUENCE OF THE GEOMETRICAL ARRANGEMENT OF THE PHASE CONTACT ON OPERATING CONDITIONS OF INTERNAL MIXING ATOMIZERS

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In this research work, the performances of common internal mixing atomizer designs are compared by quantifying pressure drop and atomization quality as a function of gas and liquid inlet conditions, mixing section geometry and discharge conditions. The design comparison is presented in the form of dimensionless plots of gas and liquid Euler numbers versus throughput parameters by confronting own measurements - including a short exit internal mixing atomizer/injector - with data found in literature. Atomization product quality is primarily influenced by atomization pressure and gas to liquid ratio (GLR). Mixing chamber geometry and discharge conditions are generally judged to be of secondary importance. Contradictory statements in the literature on the significance of geometry parameters may be resolved. This could be achieved by recognizing the influence introduced by the location of the main pressure drop contribution in the device (Table 1).

	Y-jet atomizer	Effervescent atomizer	Short exit injector
Influence of mixing section geometry	medium	low	high
Influence of discharge conditions	medium	high	low
$p_{0,gas} / p_{0,liquid}$	O(1)	O(1)	>> 1
$\Delta p_{mix-ch} / \Delta p_{disch}$	O(1)	<< 1	>> 1