Table 2.4 Flow-Pattern Transitions for Vertical Upward Two-Phase Flow Systems Based on Different Coordinate Parameters

Flow-Pattern Transition	Taitel et al. (1980)	Mishima and Ishii (1984)	Weisman and Kang (1981)
	$\alpha = 0.25$	$\alpha = 0.30$	
Bubble - Slug	$j_f = 3.0\, j_g - 1.15 \left(\frac{g \text{Æ} \rho \sigma}{\rho_f^2} \right)^{1/4}$	$j_f = \left(\frac{3.33}{C_o} - 1\right) j_g - \left(\frac{0.76}{C_o}\right) \left(\frac{\sigma g \text{Æ} \rho}{\rho_f^2}\right)^{1/4}$	$\left(\frac{j_g^2}{g D}\right)^{1/2} = 0.45 \left(\frac{j^2}{gD}\right)^{0.78}$
Slug - Churn	$\frac{l_e}{D} = 40.6 \left[\frac{j}{(g D)^{1/2}} + 0.22 \right]$	$\frac{j_g}{C_o j + 0.35(g \text{Æ} \rho D/\rho_f)^{1/2}} \geq 1$	Transition to Dispersed Flow
		$- 0.813 \left[\frac{(C_o - 1) j + 0.35(g \text{Æ} \rho d/\rho_f)^{1/2}}{j + 0.225(g \text{Æ} \rho D/\rho_f)^{1/2}} \right]$	$j_f = \frac{6.8\, D^{0.111} (g \text{Æ} \rho \sigma)^{0.278}}{\upsilon^{0.111} \rho_f^{0.555}}$
Transition to Annular	$j_g \left(\frac{\rho_g^2}{\sigma g \text{Æ} \rho} \right)^{1/4} = 3.1$	$j_g \geq \left(\frac{g \text{Æ} \rho D}{\rho_f} \right)^{1/2} (\alpha - 0.11)$ for small D	$1.9 \left(\frac{j_g}{j_f} \right)^{1/8} = \left[\left(\frac{\rho_g^2}{g \text{Æ} \rho \sigma} \right)^{1/4} j_g \right] 0.2 \left(\frac{j_g^2}{g D} \right)^{0.1}$
		$j_g \geq \left(\frac{\sigma g \text{Æ} \rho}{\rho_g^2} \right)^{1/4} N_{\mu f}^{-0.2}$ for large D	