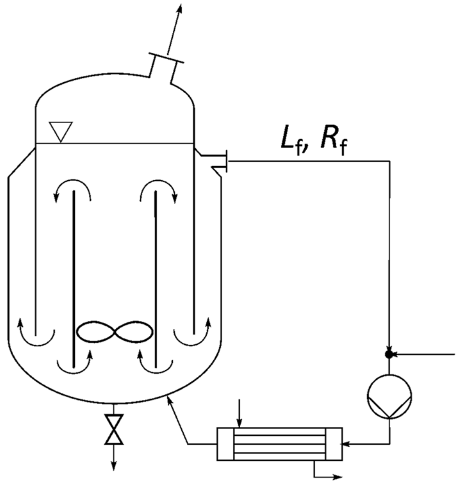

Figure 6.5 Draft-tube-baffled-(DTB-) crystallizer with fines dissolution. The cut size L_f and the flow ratio R_f are the decisive parameters for the effect of fines dissolution on the particle size distribution. Reproduced from ref. 19 with permission from Springer Nature, Copyright 2011.

baffle and are removed from the crystallizer. These fines are dissolved in the heater of the crystallizer. Besides fines dissolution this heater has to bear the thermal duty of the apparatus. From the heater, clear superheated solution is fed back into the crystallizer. Product withdrawal may be representative or classified. Essentially, the centre volume of the apparatus is a stirred vessel, which is equipped with a draft tube. The draft tube facilitates the suspending of the crystals. The two main parameters governing the effect of fines dissolution on the particle size distribution are the cut size L_f of the classifying zone and the ratio R_f of the flow rate of the fines containing stream $\dot{V}_f$ to the sum of the flow rates of the fines containing stream $\dot{V}_f$ and the product stream $\dot{V}_p$.[10]

$$R_f = \dot{V}_f/(\dot{V}_f + \dot{V}_p) \tag{6.4}$$

6.6.3 Minimisation of the Nucleation Rate

An immanent characteristic of continuous crystallizers is the steady withdrawal of particles with the product stream. For steady state operation, this steady loss in particle number has to be balanced by the nucleation rate. This rate is pivotal for the particle size distribution. A high nucleation rate leads to a fine particle size distribution and, *vice versa*, a low rate leads to coarse product. Hence, minimisation of nucleation rate is a measure for increasing the product particle size. In technical crystallizers which produce particles