Example 6.4

A solute has a constant partition coefficient of 3.8 between a solvent (extractant) phase and an aqueous phase.

A pilot scale liquid-liquid extractor operates with the following parameters:

S = 35 mL/min
F = 70 mL/min
92% of solute is extracted
D = 2.54 cm
H = 1.23 m
SPM = 280 per min

A process run is to be designed able to handle 150,000L in a twelve hour shift. The target is 97% extracted. The same S/F and volumetric throughput as the pilot scale run is desired.

For the process scale, find the extractor diameter and height, in addition to the operating SPM.