

BIOREACTOR ENGINEERING

Chapter 10

Scale-up of Bioreactor

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Exercise 1

A cylindrical fermenter with an aspect ratio of 3 is scaled-up from 10 L to 10,000 L. The fermenter is installed with an impeller with the diameter is 30% of the tank diameter. The impeller speed is 450 rpm. By assuming geometric similarity, determine the dimensions of the large fermenter.



Exercise 2

Consider the scale-up of a fermentation in Exercise 1, determine the impeller speed for the following scale-up criteria:

- a) Constant P/V
- b) Constant impeller tip speed
- c) Constant Reynolds number

