



Equipment III Reactors



Course Objectives

1. Describe the purpose and function of a reactor.
2. Describe typical applications of reactors in chemical processing.
3. Describe the theory of operation for the two main types of reactor models.
4. Describe the types of reactors typically associated with the phase or phases of the reactants.
5. Distinguish between the modes of operating reactors.
6. Identify typical operating parameters associated with controlling a reactor.
7. Describe common performance issues related to reactors and their causes and indicators.
8. Describe issues related to safe operation of a reactor.



Key Terms (Define the following)

catalyst - _____

catalytic cracking - _____

catalyst fouling - _____

catalyst poisoning - _____

continuous stirred tank reactor (CSTR) - _____

plug flow reactor (PFR) - _____

reactor - _____

run-away reaction - _____

side reaction - _____



Principles

Reactor Selection		
Homogenous	Heterogeneous	
Single Phase	Two Phase	Three Phase
<ul style="list-style-type: none">• Gas/Gas• Liquid/Liquid	<ul style="list-style-type: none">• Gas/Liquid• Gas/Solid• Liquid/Solid• Liquid/Liquid <i>(immiscible)</i>	<ul style="list-style-type: none">• Gas/Liquid/Solid• Gas/Liquid/Liquid• Liquid/Liquid/Solid



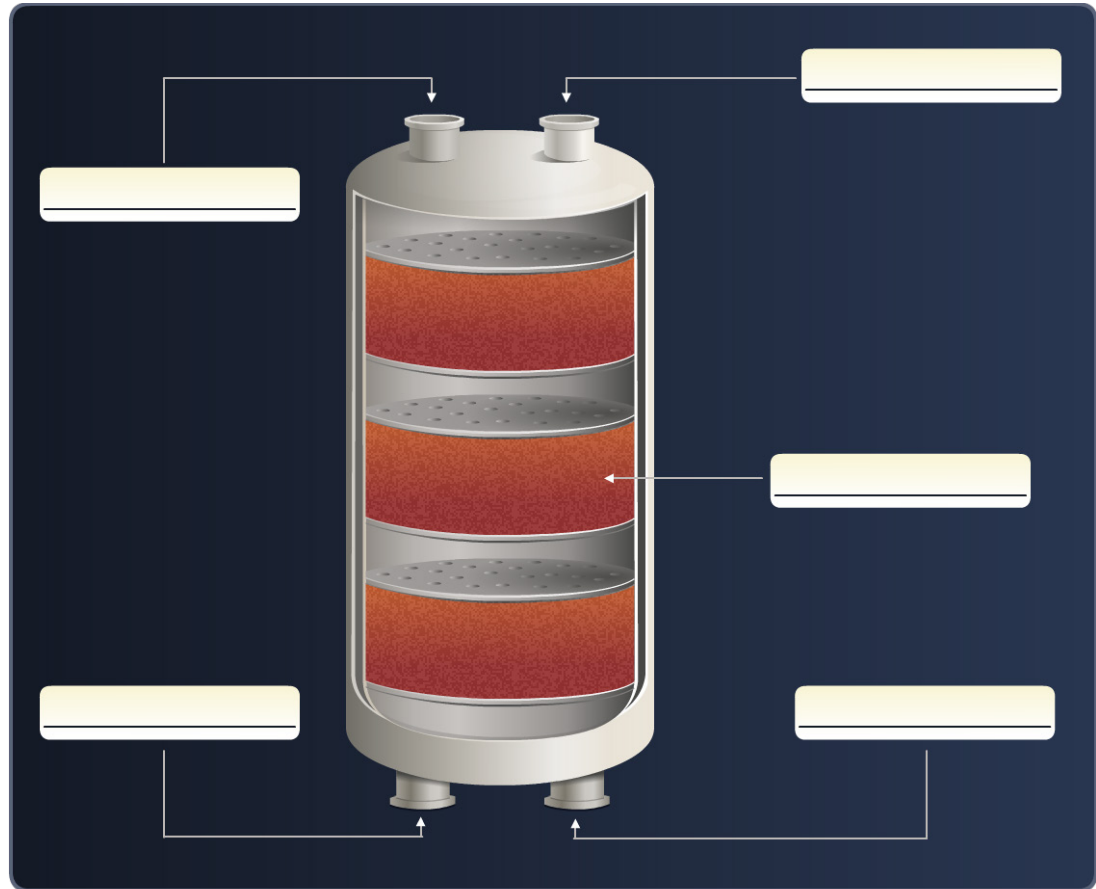
Questions

1. List the three modes for operating chemical reactors.
 - 1) _____
 - 2) _____
 - 3) _____

2. Describe the steps in a batch reaction process.

3. List the types of reactors commonly used for gas/liquid reacting.

4. Label the parts of this fixed bed reactor.



5. Why are some liquid/liquid systems considered two-phase reactions?

6. List three methods for heating or cooling reactors.

7. List three conditions that could lead to a run-away reaction.

8. Describe the equipment and procedures used to prevent or minimize a run-away reaction.

9. What are the problems or conditions that can cause a catalyst to become less effective?

10. List the common causes of fouling in a reactor system.
